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By VIC PHILLIPS

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Illustrations by Cartier, Kramer, Ley and Schneeman

COVER BY ROGERS

All stories in this magazine are fiction. No actual persons are designated either by name or character. Any similarity is coincidental.

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NOT SIMPLY MORE

EVEN this earliest form of atomic power now in immediate prospect presents one vitally new phase of importance that is rather easy to overlook. It is not simply more power, or simply more concentrated fuel; it is an utterly different form of power.

The ideal—the still science-fictional—form of atomic power would harness the energy of the atom directly and immediately to a high-level form of energy—"high level" in the sense that it would be one of the specialized forms of energy. Actually, present methods will mean that the immense energy of U-235 will be released and converted to heat, the heat used in the form of steam, the steam's energy converted to mechanical energy, and this in turn to the desired special, high-level energy; electricity. Heat being the sum of all forms of energy, the lowest state of energy, any type of energy whatsoever can be converted to heat.

Used in this way, U-235 is simply and solely a more concentrated fuel than coal or oil; it then differs from them only in degree, not in kind. It is a degradation of the energies U-235 possesses.

The important work of U-235 will be in its proper and specialized use; in these applications it will be used for what it truly is—a type of energy-source as different from any known as electricity is from the energy of a turning shaft.

The magnitude of that difference, incidentally, is rather easy to overlook, since electric power is so frequently used as an intermediate between two mechanical devices—a generator and a motor. Think of it in this light, however; the strongest animal that ever lived, or the most powerful steam engine ever built, representatives of the great mechanical power though they are, couldn't pull apart one single molecule of water. A flashlight battery the size of your finger could break up billions of them. Perfectly right and logical, too; electricity is a totally different kind of energy.

Atomic power is equally a totally different kind of energy. By elaborate manipulation, a muscle-power or steam-power engine could be made to break down water molecules. Some friction device designed to produce enormous temperatures—perhaps rubbing two aluminum oxide refractories—could generate enough sheer heat to break down a few thousandths of a percent of the water worked on. It'd take a massive device, and be most unholily inefficient, but it could be done, I suppose. Mechanical power simply isn't the right tool for the job; electricity is what's needed.

For manipulating atomic nuclei, electricity simply isn't the right tool. Oh, it can be done—some elaborate and immensely massive device, gobbling hundreds of kilowatts of electric power can be devised that will crack a few thousandths of a percent of the material worked over. It's called a cyclotron, and it weighs anywhere from as much as a full-sized railroad locomotive to as such as a transoceanic freighter, consumes power enough to operate a small town, and produces atomic beams. To detect those atomic beams, Lo! the clever physicist has designed instruments so superlatively sensitive that they will, literally, hear a single atom crack. Some six thousand tons of apparatus and power enough to run a steamer, and they detect the result with the most sensitive instruments man has yet designed. And for that accomplishment, the men that did the work merit even more acknowledgment than they have yet received. Working with a hopelessly inept tool, electricity, they have forced it to do the job it wasn't capable of; the job of breaking up atoms.

The greatest achievement is that, by that means, they've finally won through to U-235. U-235 is atomic power—and atomic power is the tool perfectly and naturally suited, by its inherent characteristics, to the task of atomic research. Atomic power means as an inevitable counterpart, atomic transmutation. Molding and synthesis of atomic nuclei is as facile a task for atomic power as the molding of chemical molecules is to electric power.

That is an immediate prospect; the research that will grow out of the availability of atomic power research tools is unguessable. But Man's stumbled on an utterly new form of energy now. The discovery of radium might be compared with the kicking of a frog's legs that led Volta to the discovery of current electricity; U-235 is the invention of the atomic dynamo to make this new current available on a usable scale. From electricity has come not only the electric motor, the magnet, the host of electro-mechanical gadgets that are better—electrical—ways of doing things possible to mechanical power, but the greater things that electricity alone is capable of.

The radio, telephone, electric light, photoelectric eye, amplifier tube, a thousand devices that are new sciences exist only because of electricity. Not one of them was remotely predictable before understanding of the full meaning of electricity.

The man that starts guessing the things you can do with this new and unknown range of powers U-235 presents is a science-fictionist, and stands a fair chance of turning out the sort of hide-bound reactionary Jules Verne was—as we now know.

But any man that starts saying what can't be done is sticking his neck well out.

THE EDITOR.

HE THOUGHT HE WAS LICKED - THEN A TIP GOT BILL A GOOD JOB!



I Trained These Men

Chief Operator Broadcasting Station

Before I completed all the lessons, I obtained my Radio Broadcast Operator's license and immediately joined Station WMPC where I am now Chief Operator.

HOLLIS F. HAYES
327 Madison St.
Lapeer, Michigan

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I was working in a garage when I enrolled with N. R. I. I am now Radio service manager for the M— Furniture Co. for their four stores.

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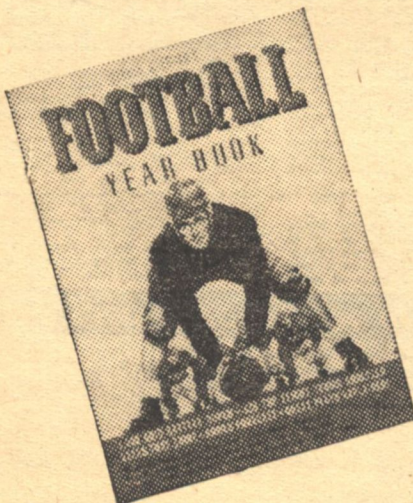
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SALVAGE

By Vic Phillips

Salvaging spaceships will probably be much like salvaging ships of the seas. They don't get wrecked in deep seas; it's on the coasts—the planets—they'll have to hunt!

Illustrated by Schneeman

WARNER BRYCE MADDEN, founder and manager of the largest salvage corporation in the Solar System was

dead. The air was full of rumors. The vast Madden interests had crumbled with their founder and

soon would follow him out of existence, some said.

Commander Jon Barnes of the Madden heavy salvage ship *HS14*, just in from a minor salvage operation to the south of Venus City, could hardly bring himself to believe that the chubby, pink and white boss was gone. The first thing that hit him after he landed was the news of Madden's death and it was a shock. As yet he could scarcely realize that when he entered the office of the corporation's Venus headquarters it would not be the cheerful, perennially boyish, eager Warner Bryce Madden who would greet him from behind the desk.

Barnes relaxed his long, powerful body and looked absently around the familiar waiting room, not thinking anything, just keeping the rumors at bay. In a few minutes he would know which ones were fiction and which weren't—in a few minutes he was going to see the new manager. They had one already, someone who signed his name M. Bryce Madden. Probably some relative who had dropped in at the death. A soft, musical note sounded in the waiting room.

"Commander Barnes, please," a smooth, liquid voice invited.

Barnes got to his feet automatically and stepped across the room to the elevator. Three brief seconds of swift motion and he stepped out on the top floor of the Madden Building. Warner Bryce Madden's private office was up here. He called it the Skyroom, all the vast valley of Venus City and the city itself lay in a panorama of wild grandeur below. To the north the tremendous, eternally mist-shrouded bulk of the Magna Escarpment heaved up as hugely massive as the background of the Universe.

Barnes stepped through the door

into Madden's office and stopped. For a moment all he could see behind the desk was a pair of big, dark eyes that looked at him with a hint of tragic anxiety in their depths.

"Who are you?" he demanded before he remembered to be polite.

"I'm Myrna Bryce Madden, Warner Bryce Madden was my father."

Commander Barnes stood without saying anything for a moment. "You're M. Bryce Madden, the new manager?"

The girl nodded. "Won't you sit down?"

Barnes subsided into a seat that embraced him voluptuously. He could see it now, Madden had been plump and blond. This girl was a slim brunette, jet-black hair and winged eyebrows, startling above the whiteness of her face, but the firm mouth and chin were the same.

"I brought in my report." Commander Barnes remembered suddenly. He handed the packet of folded forms across the desk. The girl took it and laid it down without looking at it.

"You were pretty well in my father's confidence, weren't you?" she asked directly.

"Yes, on Venus."

Myrna Bryce Madden was silent a moment.

"I suppose you've heard rumors."

"Some," Barnes admitted.

"Well, you can believe the worst of them," the girl said bitterly. "The Madden Salvage Corp. is about wiped out."

Barnes had half known it was bad but the effect of final word from the one person who should know was devastating. For a moment he was stunned, the Madden Salvage Corp. had always seemed to him to be too big for anything to happen to it. Fragments of thought flitted through his mind, the crew's quarters of Mad-

den's ships were more like the interior of luxury space liners than salvage craft. Skyhouse, the incredibly beautiful mansion Madden had hung impossibly on the mountainside above Venus City. Artists, master builders, architects and dreamers had been brought all the way from old Earth to build their souls into that ethereal perfection. It must have cost millions. There were countless other things that had come into being under the magic touch of Warner Bryce Madden's pudgy hands for he had built and lived as most men would like to live, his life had been one long flame of glory; it seemed that it had been snuffed out at its height. But flames leave ashes and they were for his daughter. The taste of them had twisted the youthfulness out of her face, shaded in a veil of bewildered hurt behind her eyes and firmed the naturally soft lines of her mouth.

"Well, say something," she demanded nervously. "Don't just sit there."

BARNES CAME OUT of his daze: "I . . . I'm very sorry," he muttered. What the devil did you say to a girl who looked at you as though her world had just kicked her in the stomach?

Myrna was slowly reducing Commander Barnes' carefully prepared report to an unreadable pulp. She spoke.

"If anyone was particularly interested, I could save your ship, the *HS14*, providing I can produce a lot of money in about ten days. Do you know of any salvage project worth about six or eight million that we could prove up on in that time?"

She asked it almost challengingly as though she knew he didn't. She was right. Commander Barnes shook his head.

"There's been nothing like that for the last twenty years," he said.

Myrna laid the report forms down and smoothed them out carefully.

"What about Interplanetary's liner *Pinnafore*?" she asked quietly.

Barnes looked at her quickly. He hoped she wasn't depending much on that.

"The Hertz outfit had four ships out on that project for three weeks and they found no sign of the ship. It's supposed to be down north of the Magna Escarpment and that's unexplored country, no one saw it crash."

"I know," Myrna agreed. "The *Pinnafore* blew out its drive manifold in its fourth deceleration orbit. The explosion wrecked the refrigerators and the ship was abandoned because of excessive air-friction heat. Commander Nordune altered course with the air brakes to make sure the ship wouldn't hit Venus City, but he didn't have time to plot the new course. All he was sure of was that the *Pinnafore* would land somewhere north of the Magna."

Barnes nodded. That summary was substantially correct.

"And as you say Hertz spent three weeks hunting without finding anything," Myrna continued as she gathered the ends of all the threads that led into the mystery. "Obviously they were searching in the wrong place."

For a moment Barnes wondered if she was trying to be funny, but the girl was dead serious.

"The Hertz navigators plotted the most probably course of the *Pinnafore's* flight from all the data they could get, principally Commander Nordune's report. They didn't have enough data." She glanced up at Commander Barnes as though expecting some kind of comment. Barnes didn't say anything.

"I've got some pertinent informa-

tion they didn't have," Myrna finished slowly.

"Such as what?" Barnes asked after a pause. He was interested in spite of himself.

"When Dad died I found this among his personal belongings."

Barnes got up and Myrna spread a photographic chart on the desk. It depicted North Venus, but there was something funny about it, it seemed sort of bare.

"There isn't much on it," he commented.

"There wasn't much to put on it then, this chart is thirty years old."

Barnes looked at the old map. A dozen questions connecting this outdated chart with the present possible position of the missing *Pinnafore* crowded up for utterance. He selected one tactfully.

"What's this circular route marked in here?" he asked. "No one's been that far north of the Magna."

"Dad was," Myrna explained. "When he first came to Venus he salvaged one of the Morgan Line freighters with a cargo of mining equipment. That was a big haul in those days, so he celebrated. He loaded his ship with fuel, discovered Madden's Pass and headed north of the Magna as far as he could go. Being the first in new country like that was his idea of a good time. Somehow, the record of the trip didn't get included in the official maps; they weren't so particular about such things then."

Myrna stood up, nervously intent. She laid another chart over the top of the old one.

"This is a section of the old chart on a larger scale except that I've added some notations from the log of the trip," she said. "Notice this farthest north point of the course. Here Dad's ship crossed over a narrow valley about five miles wide and

they observed clouds going through it at four hundred miles an hour."

"Just a minute," Barnes objected. "Four hundred miles an hour is a lot of speed for a wind, even on Venus."

"And I said four hundred miles an hour," Myrna almost snapped. "I've got photographs and the original record tape from the air-speed indicator."

"Go ahead," Barnes invited.

MYRNA MOVED a slim finger to indicate another point farther south on the map. "Here is where that Morgan Line ship came in off course last year. It reported a mountain ridge ninety thousand feet above Venus City level and a normal air speed of forty miles an hour." Myrna moved her finger quickly farther north and a little east. "This is where one of the Hertz ships crossed the same ridge and reported an air speed of ninety miles an hour. Now connect these three points, forty, ninety and four hundred miles an hour. What does that curve look like?"

"It looks like the interior curve of a Venturi tube," Barnes said slowly.

"Exactly," Myrna cut in. "The biggest Venturi tube anyone ever heard of. Over here to the east somewhere must be another ridge of mountains forming the other side of the funnel; I think it must be about three hundred miles wide at the base. A Venturi of that length should put the wind velocity up somewhere around nine hundred miles an hour, but this tube hasn't got a top on it and there'll be considerable turbulence along the sides. I think that should drop the actual speed down to about four hundred."

Barnes was beginning to get it, but Myrna was explaining away ahead of him.

"Now bring in the *Pinnafore*," she

instructed. "Everyone agrees that its course led over Venus City and that puts it right in the middle of our Venturi tube. The *Pinnafore* was coming in with its atmospheric wings fully extended and its air brakes full on. What do you think would be the result?"

"Well the ship would be headed north and the farther it went the more closely its course would conform to the wind direction."

Myrna nodded agreement. "Giving a most probable course something like that," she said, indicating a curved blue line on the chart. "About three hundred miles east of the area the Hertz people searched."

Barnes was silent for a long moment as he checked over the various points Myrna had made.

"You could be right," he ventured finally.

"I know I am; I've got to be," Myrna stated quickly, definitely.

"But if we do find the *Pinnafore*, it will probably be in a lot of small pieces. They won't be worth much," Commander Barnes pointed out cautiously.

"Why do you think the Hertz Corp. kept four ships looking for the pieces for three weeks?" Myrna demanded. "The *Pinnafore* was carrying a shipment of Johnson metal drill heads for Venus Consolidated," she answered herself.

Commander Barnes blinked thoughtfully, that explained a lot of things. He had wondered why Hertz was so anxious to locate the missing liner. Johnson metal was worth a thousand times its weight in practically anything. The alloy was almost indestructible and fabricated into drill heads it was priceless.

"If you salvage the *Pinnafore* and recover its cargo, then what?" Barnes asked. He thought he knew but he

didn't want to jump to any conclusions.

"Then I'll have the *14* and some capital. That should be enough to start again," Myrna said quietly.

Barnes lifted his head and looked at her directly. Something in him started to live again. This daughter of Madden's had guts.

"That'll be enough," he said softly. "The *14* is the best salvage ship that was ever launched. When do you want to start?"

"Can you make it tomorrow morning?"

"The ship'll be ready," he answered without hesitation.

Myrna folded the two charts carefully, her fingers trembled a little. She looked up with the flicker of an apologetic smile.

"I was kind of depending on you," she admitted.

Commander Barnes answered the fragment of a smile. "You should," he said. "Your father did. Incidentally the best thing for you to do is to get a little sleep; you look as though you've been missing some."

"I have," Myrna confessed, "but I think I can sleep now."

"Good. I'll be going. I've got to get busy. I'll see you in the morning."

Myrna watched him leave. For the first time since the catastrophe of her father's death had devastated her world she felt like living again.

COMMANDER BARNES wasted no time. He went directly down to the Madden docks where the two-hundred-foot length of the *HS14* lay in the launching cradle. As he neared the massive bulk of the cradle he felt the stirring of pride that sight of his ship still invariably aroused. It was a new ship functionally designed, there could be no mistaking the purpose for which it was in-

tended. Lift and power and rugged strength to withstand the merciless, battering punishment of salvage work were built into every line of her.

His first mate, Jarl Bronson, was standing on the dock, superintending refueling operations. Bronson was a huge man, half a head taller than Commander Barnes and nearly twice as wide. His face looked as though he had been dropped on it when he was a pup. Barnes took him aside and told him exactly how things stood and what Myrna Bryce Madden wanted them to do.

"What do you think of it yourself?" Bronson asked.

"It looks just crazy enough to be good, besides we've got nothing to lose."

"Is the crew supposed to know?"

"All they need to know is that we've got a hot tip and we're following it up."

"Just a minute, sir," Bronson excused himself.

A slim, dapper little man came stepping lightly down the gangway from the *HS14*. He was scrubbed and polished till he practically shone, his crisp, green uniform was an achievement of sartorial perfection crowned by the crimson blaze of the maintenance chief's insignia he wore on his cap.

"You going somewhere?" Bronson asked conversationally.

Chief Maintenance Officer Atkins drew himself up to his full height.

"Mr. Mate, 'somewhere' doesn't begin to describe it. Where I'm going tonight is places. You see that village before you?" The generous sweep of his arm took in the whole of Venus City, where the evening mists were just beginning to settle about the highest towers. "In the morning it'll be but a ruin, for tonight I'm going to take it apart,

stone by stone and girder by girder."

The big first mate nodded approval. "That should be an interesting occupation," he agreed. "Do you think you'll be through in time to get that new forward repulsor activator installed for the morning?"

"For when?" the maintenance chief asked blankly.

"Tomorrow morning. We're leaving first thing. The order just came through."

"Tomo— No, sir! I'm not going to do it!" Atkins tore off his cap and slammed it on the dock. "I don't have to! I've got a contract! I know my rights! I— Well, don't just stand there looking dumb. Where the devil have you hidden those replacement parts?"

"They came aboard this noon," Bronson explained. "They're in the repair shop."

"So, they're in the repair shop and I'm the last man you'd think of telling. Sure, I'm just the chief of maintenance. Well, get out of my way; I haven't got time to stand around here all night." Atkins whirled about and headed back up the gangway. By the time he got to the ship he was swearing like a drunken miner and yelling his head off for his assistant.

Bronson shook his head slowly as he turned back to his commander.

"He's a very violent little man," he explained sorrowfully.

Commander Barnes grinned. "It looks that way," he agreed, "but I think we'll get those activators installed in plenty of time. Anyone else left the ship?"

Bronson shook his head. "No, Atkins is always first."

"Good. Come aboard as soon as that fuel's in."

Commander Barnes hurried aboard and went directly to the forward control cabin. He knew he had

been a little optimistic when he promised the ship for the morning. There was no time to lose. He put through a general call on the communication system. Within fifteen minutes preliminary flight reports had been turned in by all the ship's officers. An hour and a half later, Bronson had, by means of some species of magic known only to first mates, filled the requisition list with a minor mountain of supplies and replacement parts which in the normal course of operation would have taken two days to clear through the supply department.

BY THAT TIME the overhaul was well under way; in spite of the time limit Commander Barnes refused to pass up any part of the routine. The solution to the problem of doing a three-day job in ten hours was the abundant application of men and power. He contacted Jake Pearson, chief of the personnel division.

"Hello, Pearson. I've got a rush overhaul job to do and I need some men."

"Well, that's fine; I guess we can fix you up," the personnel chief responded and Barnes winced; he didn't trust that agreeable tone. "You see we've just got seven ships in dock," Pearson explained, "and I'd be just delighted to yank the crews off the other six and shoot them over to your cradle. Nuts!"

"Don't try to be funny," Barnes suggested. "I don't want six crews, and I've got to be out in the morning."

"Yeah," Pearson agreed, "that's what they all tell— What?" The question was a startled bark from the personnel chief. Barnes heard a quick, muttered conference. Pearson's voice sounded a trifle dazed when he spoke again. "Now, look

here, Barnes," he said carefully. "I don't know what you've been up to, but you're going to take those six crews and like it. I just got an order from the head office saying so."

Barnes gulped and recovered quickly. "Well . . . well, sure, that's what I've been saying. This is a rush job. Just send the boys along, I'll see they keep their little fingers out of mischief." He switched off hurriedly while the news was still good.

Before he could open negotiations for more power, reports came in from No. 5 and No. 7 generating units that they had been ordered to supply No. 14 cradle up to full potential. Evidently Manager M. Bryce Madden was doing her part. From there on the *HS14* was buried under a high-speed confusion of orderly thoroughness. Every welded seam and rivet throughout the whole length of the ship was tested. In his enthusiasm Jurd Parker, roused to full consciousness for the first time on record, practically rebuilt his radio equipment. Commander Barnes personally checked the control system and the scanning equipment. A blue cloud of badly fused atmosphere in the bow marked the spot where Chief Maintenance Officer Atkins cursed the forward repulsor activators into submissive obedience. From the outside No. 14 cradle began to take on the appearance of the lowermost pit of the seven hells as a new coat of flexible silica varnish was fused onto the outer hull of the salvage ship.

By midnight operations were running half an hour behind schedule, but when the morning mists began to rise in reluctant streamers from the valley of Venus City the work was finished, an hour ahead of time. The *HS14* lay in its cradle, sleekly rejuvenated under its new outer skin from the polaroid screens of the for-

ward observation ports to the outer insulation ring of the drive tube.

Commander Barnes completed a final check-up. "It looks like we're finished," he decided.

"It does that," Bronson agreed. "Incidentally Miss Madden sent her dunnage aboard last night. I put it in No. 3 cabin."

"Miss Madden? Hm-m-m. Well, I guess if she wants to come along, she can. After all, it's her ship."

Barnes yawned, shook his head and glanced at his watch. There wasn't time to get any sleep before they pulled out. "I guess we can go and see what kind of a job the varnish crew did," he suggested. Bronson raised no objection and they adjourned to the midships gangway.

"There comes someone," Bronson observed as they stepped outside the ship. Barnes looked down the dock and saw the slight, trim figure of Myrna Bryce Madden come in sight through the last trailing streamers of morning mist. She seemed to be in a hurry. They waited for her at the foot of the gangway. As she approached, Barnes saw six men in the uniforms of the Venus City administrator's office come through the dock gates and start toward the cradle. Myrna's face was white and pinched into a resigned expression of utter defeat.

"Something wrong?" Barnes asked quickly.

"The flight's off," Myrna answered briefly as though she didn't trust herself to say more.

Barnes was silent a moment.

"How's that?" he asked softly. "Complications set in?"

Myrna nodded. With an effort she controlled the disappointment out of her voice.

"Some of Dad's creditors got an order restraining the operation of all Madden Salvage Corp. equip-

ment till a survey of assets is made."

Barnes rubbed his hand through his hair. "That doesn't sound legal," he objected.

"They can make it stick if we don't contest the order."

"Well, you better go ahead and contest it then."

"That wouldn't do any good," Myrna told him with bitter hopelessness. "By the time the case is cleared up, it will be too late to do anything about the *Pinnafore*." She nodded toward the entrance of the dock. "Those are the men from the administrator's office; they're coming to impound the ship."

Commander Barnes looked at his first mate. Bronson nodded thoughtfully. "We're all ready to take off," he said.

Barnes turned to Myrna. "You better go aboard."

"Go aboard? What do you mean? What—"

"Don't argue; just get going," Barnes advised and gave his boss a shove up the gangway. Myrna stumbled, then whirled about.

"Who do you think you're pushing?" she demanded. "I— Oh, I see," she said faintly as she began to get the idea. She retreated inside the ship and watched.

THE administration men saw the sudden maneuver and came forward on the run. The commanding officer started up the gangway.

"Commander Barnes, your ship is impounded," he said as he came. "I'm arrest—" At that point Barnes hit him, and he said no more. The other five administration men didn't hesitate. They came purposefully on up the gangway. They knew their business, but Bronson knew it better. He hit two of them simultaneously and violently, then he got his head down and rushed the whole crowd

back onto the dock where he proceeded to strew them about over a wider area. It didn't take long; the action was uproarious and one-sided till one of the administration men went for his side arms. Bronson didn't linger. He whirled about and leaped up the gangway. Barnes slammed the midships hatch shut and they raced for the control cabin. Myrna followed more slowly, a little dazed by the rapid action.

Barnes cut in communications.

"Stand by to take off," he ordered.

It was ten long seconds before all stations had acknowledged and five more elapsed before the ground station came in.

"Going up," Barnes warned. He eased forward cautiously on his repulsor controls; all the dials responded evenly. The administration men evidently hadn't thought of the power supply yet. He moved the controls quickly through three preliminary stages to full extension, the ground repulsors, synchronized through the ship's controls matched his action with their greater power, and the huge salvage ship bounded suddenly skyward. It caught up to the rising mist blanket and plunged upward to the full five-hundred-foot extension of the ground repulsors, then started to climb another two hundred feet on its own power.

Abruptly the ground repulsors cut out dead. The huge salvage ship dropped sickeningly, and hurtled back toward the cradle. Commander Barnes blasted the drive wide open. The big ship seemed to gather itself, then heaved forward with a surge of power. The vertical plunge of the huge craft became a power dive as it tore through the shredded mist and thundered down on the dock. Barnes saw the administration men fleeing terror-stricken from the ex-

pected crash, but, with the thrust of the drive and lift of the fully extended atmospheric wings, the ship was entirely under control. With grim satisfaction, Barnes dropped the ship within ten feet of the heads of the fleeing administration officers before he lifted the nose and roared up into the cloud level, the thundering voice of the drive lifting on a rising glissando to full throttled power.

The big ship sliced away into the mist that still hung over the valley of Venus City. With its bulbous forward observation cabin and fully extended atmospheric wings it looked like a cross between an inquisitive frog and a giant sting ray on the prowl.

Myrna found her way to the control cabin. Most of the space was occupied by the bulk of the huge infrared scanner that was used for searching deep, mist-filled valleys and to give the ship eyes when operating in fog. Barnes was driving his ship at full throttle, his eyes on the infrared scanner screen.

"I hope you realize we are outlaws now," Myrna said conversationally. "Where are we going?"

"To look for the *Pinnafore*, unless you've changed your mind," Barnes told her without looking up from the control panel.

Myrna drew a deep breath. "No, I haven't," she said. "Let's go."

Barnes grinned. "Good, that's all I want to know."

Bronson's face was horribly contorted in an agony of thought. Finally he became articulate.

"I was thinking," he said slowly.

"Well, don't let it get you down."

"It's this way," Bronson continued. "Those fellows who had the dizzy spells and fell down on the dock are possibly going to feel a trifle hostile. I wouldn't be at all sur-

prised if they got on board something fast and tried to head us off at Madden's Pass."

Barnes blinked thoughtfully.

"You sound like you're talking sense," he agreed.

"Do you mean we're liable to be stopped?" Myrna asked anxiously.

"The way Bronson puts it, we're darn near sure to be," Barnes told her. "You can't go bopping the administration officers about, without some sort of reaction setting in."

He retarded the throttle to half speed and changed course slightly. Bronson glanced at him questioningly.

"I'm thinking of the big pile of cumulus clouds that rises up over the end of Martin's Deep every morning," Barnes explained. "There's enough of an updraft there to let us soar without power. That way we won't be detected. We can keep in the clouds and watch to see if anyone is on our trail."

"But that'll let them get ahead of us," Myrna objected. "We've got a head start. Can't we beat them to the Pass?"

"A heavy salvage ship going through the Pass at full throttle would be more or less of a public spectacle," Barnes pointed out. "Particularly if there were a couple of patrol ships in pursuit. That wouldn't give you much chance of slipping north of the Magna unnoticed and surreptitiously lifting the cargo of the *Pinnafore*, which I believe is the object of this expedition."

"But what are you going to do if someone is following us?" Myrna demanded. "Madden's Pass is the only way north. If they block that, we'll be stuck here. We haven't got a big-enough fuel reserve to go over the top of the Escarpment, have we?"

"No," Barnes agreed, "but I'd like

to see if we're followed before I make any plans for the future."

Myrna subsided. She didn't feel particularly anxious to lay any bets on the immediate future either. At present it didn't look as if there would be any as far as salvage operations were concerned.

THE MORNING MIST had risen to three thousand feet and the ship was in the clear approaching the huge pile of cumulus cloud that marked the north end of Martin's Deep. No one had ever plumbed the depths of that vast depression simply because as far as anyone knew there was nothing down there worth going after. No one was willing to pay the fuel bills involved in climbing in and out of the apparently bottomless Venusian valleys just for the fun of it.

The salvage ship had been climbing and entered the updraft at two thousand feet above Venus City. They felt an abrupt upsurge as they entered the cumulus area and Commander Barnes cut the drive. Immediately the ship was blind except for the infrared scanner.

"I hope they hurry up if they're coming," he remarked as the voice of the drive whispered away and faded into nothingness. "This ship is no sailplane."

The big salvage cruiser handled well, but within five minutes it had lost two hundred feet of altitude in spite of everything Commander Barnes could do short of firing the drive. They lost another three hundred feet before Bronson drew Barnes' attention to the scanner screen.

"It looks like something," he said. The shape of a ship was fading in rapidly at the limit of visibility. It was traveling fast and in a few sec-

onds it was distinctly outlined on the screen. Bronson stepped up the magnification till they could read the identification marks.

Myrna looked uncertainly at the two thoughtful salvage men.

"That wasn't a patrol ship," she ventured tentatively.

"No, it wasn't," Barnes agreed. "That one belongs to the Hertz people. It's the *S7*, the fastest survey cruiser they've got." He thought a moment. "Could they have had anything to do with that restraining order?"

Myrna blinked. "Their fuel and equipment accounts are big enough to get some of our creditors to close down," she admitted. "But why should they?"

"They'd know we had something in prospect when we pulled out in such a hurry. If they suspected it was the *Pinnafore*, they might want to hold us till they had another try at it themselves. They might even have got hold of some of your exclusive information," Barnes suggested. "If our administration office friends were on board that ship, the pass will be closed now."

"You mean we've got to turn back?" Myrna asked, unspoken protest in her voice.

"It looks that way," Barnes agreed; "but before we do, I'd kind of like to go and take a look at Hellier's Gap," he said casually. "We won't have to pass that Hertz ship, the Gap is this side of Madden's Pass."

Myrna looked at him quickly. "What for? The Gap isn't a pass."

"So I've heard," Barnes agreed. "Have you ever been in it?"

"No, but no one's ever been through it. What do you know about it?"

"Maybe nothing, but I've been kind of curious to look into it for a

long time. I've never had the time and the ship before."

Myrna was silent a moment. Perhaps this commander of her father's did know something. It was a chance, maybe a remote one, but there was nothing else to do.

"It won't do any harm to make a short survey flight. We might as well enjoy ourselves while I still own the ship," she conceded casually, and made a private agreement with herself to build no hopes on it.

COMMANDER BARNES' answer was to close the ignition switches of the drive and advance the throttle. The *HS14* came to life with a thunder of power and tore out of the cumulus area into the clear. Barnes laid his course angling north toward the vast bulk of the Magna Escarpment, following along the trail of the *S7*.

Soon the unbroken wall of the Escarpment was flowing smoothly by on their right as the salvage ship streaked westward. Myrna moved to a direct vision port in the projecting right wing of the control cabin and looked back the way they had come. As far as she could see the huge, ponderous buttresses, jutting knees and sheer curtain walls of the southern face of the Escarpment hemmed in the distance with solid green that darkened to blue. The Gargantuan range was a whole world in itself, with minor mountain systems, piled impossibly outward from its face; the narrow, cruel gashes of bottomless valleys slashed deep into its flanks. Incredibly it seemed to be a world afloat on the floor of clouds that writhed and boiled with sluggish power two miles below, giving relief from unguessable, eye-aching depths. The whole gigantic, cloud-wreathed scene was staggering in its immensity.

"The Gap is just ahead," Com-

mander Barnes warned, as he cut the *HS14* speed down for maneuvering.

The big ship came about slowly. Hellier's Gap seemed insignificant, just a narrow split in the sheer face of misty blue-green that soared up into the high cloud level thousands of feet above. They began to pick up speed, heading directly for the face of the range.

Level, densely grown benches scarred it horizontally, pinnacles and minor mountains of weathered rock stood out, deeply folded valleys and ravines ran back into the mountains; the sides were slashed with the wide scars of rock slides while the sheer cliffs were stained with brilliant splashes of metal oxides and colored with banded porphyry, onyx and marbleite. The salvage ship headed directly for the center of the Gap that widened and deepened as they approached like a pair of slowly opening jaws. From a distance the Cyclopean cleft had appeared as sharply and precisely cut as though a giant chisel had split the mountain range, but a closer view showed it to be anciently weathered. The walls had been vertical cliffs when the original cataclysm tore the mountains apart, but they were now stepped and benched with ledges and slanting rifts where masses of rock had fallen away.

The *14* drifted slowly on, a subtle air of tenseness invaded the cabin as the tremendous mountain wall swelled steadily toward them. Soon they could pick out details of the fantastic foliage that draped in solid masses of greenery every inch of the face of the Escarpment that wasn't actually vertical. There was movement, too, a sudden flash of metallic blue gleamed against the green as a three-foot gliding lizard launched itself into space and planed swiftly downward. The soundproof walls

of the cabin cut off its sharp, raucous barks of alarm, but the sound aroused a dozen others of its kind and the brilliant squadron swooped wildly down, then wheeled suddenly and disappeared in the luxuriant foliage.

Myrna followed them with her eyes and looked farther past, drawn irresistibly down the mountainside that dropped in folded curves like the drape of a rich curtain into the utter profundity of mist-shrouded depth. She pulled her eyes sharply away and back up to level. With a minor shock she saw that the ship was just about to enter the Gap.

The mighty shattered cliffs towered interminably upward in tremendous, overwhelming masses of brilliant color. The ship surged steadily forward, the cliffs approached in somber, inscrutable dignity, flanked them with disturbing possessiveness, then marched ponderously past. Myrna experienced an uncertain, empty feeling in the pit of her stomach. They were in the Gap! It was as though they had passed through the Titanic entrance to some vast temple of mystery.

She looked back along the curving hull. Suddenly she caught her breath. The vast, somber cliff on the left of the entrance had moved! Then she saw it was a ponderous, solid-looking cloud bank rolling in from the east. It moved onward with slow, irresistible smoothness. Myrna held her breath until the last narrow ribbon of distance was reduced to a thread and vanished. The timing of the symbolism was incredibly, powerfully perfect, the way back was closed, ahead lay the only route. One comparatively tiny ship against the whole vast, wild, northern hemisphere. Myrna let her breath go in an almost inaudible sigh; she had never seen Venus like this before.

NINE HOURS later Myrna's soul was glutted with grandeur, numbed with a surfeit of immensity. Helier's Gap was the entrance to a comparatively low altitude, commercially practicable pass through the Magna; they had proved that, but it had taken three hours. Three hours of cautious probing of the tortuously twisting, steadily narrowing rift, creeping forward at half and quarter throttle speeds, sometimes dead slow when the mist closed in. From the first Commander Barnes had kept the full extension of his repulsor fields in contact with the floor of the Gap; they were taking no chances. That was the constant theme of every minute, stultifying, smothering, patient caution. Every move, every thought or action of any kind had to be weighed and considered, planned ahead until Myrna was ready to scream, but she didn't. People didn't scream or make unnecessary noise in this vast world of height and mist and weight and silence.

They had burst out of a final bank of smothering mist at seventy-four thousand feet, plunged sickeningly downward as the support of the repulsor fields disappeared, the world had fallen away from in front and all around them. In a few seconds the accelerating drive hurled the ship forward above stalling speed and they soared out over an utter immensity of emptiness. The Escarpment plunged down as precipitately on this northern front as it did on the south face. The valley at its base was even more vast than the abyss that cradled Venus City. It had taken an hour at full throttle to cross its endless, ragged cloud continents on the most probable line of the lost *Pinnafore's* course. For six hours they followed that line, plunging deep into the nightmare tangle of mountains

that lay on the other side of the tremendous depression.

The line held almost due north and as they traveled the air got steadily cooler. Nine hours out and the mean temperature was down four degrees and the air speed was beginning to pick up and whip along at its scheduled velocity. Everything that grew leaned north in this vast valley of the winds where the clouds were all thin cirrus streamers, reaching tenuous, ghostly, beckoning fingers to the north. There was more life, too. Where they had seen dozens of gliding lizards in the Venus City sector, there were flocks of hundreds in the virgin valleys of this eternally cloud-veiled north country. Insects swarmed in uncounted billions. Some were giants. Two huge, scarlet and black killer moths, measuring thirty inches across the wings were caught, while others, still larger were seen preying on the brilliant squadrons of gliding lizards. There were indications of other life forms in the heavy jungle of verdure that clung to the precipitous mountainsides.

Twelve hours was the scheduled terminus of the *HS14's* search because nobody had yet discovered an effective method of winning arguments with a fuel gauge.

Ten hours out they found the *Pinnafore*.

The miracle was as simple as that. The salvage ship was riding a screaming gale that steadily built its velocity up to a confirmation of Madden's observation of four hundred miles an hour. The big ship was absolutely helpless in the grip of the torrent of air as it hurtled blindly into a ragged, narrow, mist-crammed split in a mountain wall. Before the occupants had time to realize their perilous impotence they were through and the *HS14* was plunging precipitately down the



The huge salvage ship fled up the canyon like a thing pursued, twisting desperately to miss the jagged walls.

other side of the range. The drive immediately blasted them forward into flying speed, but they swept on helplessly down in a descending column of air that spilled out of the Pass and plummeted almost vertically to the valley floor beyond.

Commander Barnes cursed industriously to himself as he nursed the big salvage cruiser out of its dive. The altimeter clocked off six thousand feet before he managed to level out, then he pulled up the nose and climbed till there was fifteen hundred feet of sky room between his ship and the valley bottom. Four and a half thousand feet overhead the river of air poured resistlessly on, but the narrow valley was a deep, comparatively still, backwater pool in the stream.

Two minutes after they reached what Commander Barnes considered a safe altitude, they swung out from above the lake of mist that the river of air had poured into the valley and a ship lay directly below them.

COMMANDER BARNES just stared. He was unwilling to believe his eyes, but the identification marks on the fully extended wings of the stranded liner were clearly visible. Incredible as it might seem it was the *Pinnafore*, apparently undamaged on the level, green valley floor.

"I don't believe it," he said slowly.

Myrna turned her head, a sickly, uncertain smile of triumph on her face, her hands gripped white-knuckled on the edge of the port coaming.

"You don't need to believe it, commander," she said, "there's our ship. Let's go get it before it evaporates or something." Her father's nickname had been Lucky Madden, but there was a hint of the supernatural in that motionless, apparently undamaged ship. She felt it called for

some sort of an explanation.

"You see, that's the only thing the *Pinnafore* could do once it got into that air stream. It just had to land here; it's the first place the wind would drop it. It's perfectly simple." Her voice trailed off uncertainly.

"A ship blows across half a planet and lands right where you expected it to, and it's perfectly simple," Bronson observed generally.

"Maybe you could break down and allow just a little for luck," Barnes suggested.

"Yes, I guess we could," Myrna agreed soberly. "Come on, let's go down."

They had passed over the *Pinnafore* heading toward the north end of the valley. Commander Barnes pulled up the nose of the ship and side-slipped, stalled and slipped again in two reaches of a falling leaf, pulled out and lost more altitude in a tight turn, and they were heading south toward the *Pinnafore* again.

"It looks good," Bronson suggested as they settled lower and got a closer view.

"Hm-m-m, maybe. Maybe too good," Barnes conceded unwillingly with caution born of a life spent almost entirely in conflict with unforeseen complications. None the less, this did look good, the valley showed every indication of a soft, silted bottom. The derelict appeared to be completely intact, the cargo was sure to be undamaged. In a few minutes they'd know, one way or the other. The valley bottom was coming up fast.

"Repulsors, full extension," Barnes ordered briefly.

"Full extension," the bulky first mate acknowledged.

Barnes glanced automatically at the altimeter. The needle went steadily on past two hundred to one

hundred and seventy feet.

"Bronson! Repulsors—" The ship was losing flying speed, mushing down rapidly; the altimeter needle dipped to one twenty.

"Repulsors full extension, no contact!" Bronson snapped, the tense-ness of alarm in his voice. Instinctively Commander Barnes dropped his eyes and looked downward through the floor port.

"Bronson! Look!" His voice choked. "We're going down!" Before Barnes' astounded eyes the solid floor of the valley heaved and surged, caving unbelievably downward under the impact of contact with the ship's repulsor field. In the brief second that he watched, Commander Barnes saw the luxuriant mat of green foliage rip apart and plunge down into the shiny blackness that heaved and boiled away from the pressure of the field. No solid! Repulsor control was gone. The ship was on atmospheric control. The ground rushed up as falling momentum increased! Then his hand was on the throttle, the ship shuddered under the full power of the drive. The approaching ground swirled astern in a blur of increasing speed. Bronson threw up his arms and cowered behind them, framing his face against the crash. Barnes stood helplessly, one hand jammed forward on the wide-open throttle, the other straining back on the elevator controls. His face grayed out with the ebb of blood, for a long, horror-filled moment he couldn't move. All energy drained into the empty pit that was situated where his stomach should be, he froze on the controls and awaited disaster as the ship plunged down.

DISASTER came—almost. The nose of the ship lifted with the brutal insistence of jammed controls. A

terrible, grating shudder ran through the whole fabric as the vertical fin ripped a deep furrow along the valley floor. Then the ship was clear, blasting southward with the drive roaring wide open and climbing crazily like the crescendoing burst of a nova. It plunged into the lake of fog that blanketed the south end of the valley. With a sudden, staggering heave of reaction the ship abruptly lost its lift, its climb was slowed to a laborious upward struggle. Barnes lurched forward and sprawled over the padded control panel. In a moment he recovered and realized what had happened. They had run into the column of air that spilled with tremendous force down out of the Pass. He pulled the ship out furiously to the right. In a fraction of a second it tore loose from the river of air and shot wildly north through the clinging mist up the side of the valley.

Too close! Bronson moaned softly and held his repulsor controls rigidly at full power and full extension as the green mountain wall loomed hugely ahead. Speed, power and momentum swung the big salvage ship's course in a curve that included part of the mountain wall, the power of the repulsor field flattened the curve a little—a little more—enough. With a violent, tearing sound the *HS14* swung and roared out over the valley, a lei of green vines draped over the forward control cabin. Barnes put the ship into a climbing turn and held it there till the floor of the valley was three thousand feet below. He unwrapped his cramped fingers from their death grip on the controls and started to breathe again. He brushed the beads of sweat from his lips with the back of a hand that shook a little and looked at Bronson. The first mate deflated with a gusty sigh and his face returned to normal color.

"That wath thome ride," he lisped softly. Commander Barnes fought down an almost irresistible urge to laugh and felt better.

There was a small moan of distress from Myrna. Her dark eyes were wide, she swayed a little uncertainly as she stood and her face was tinged with a delicate shade of pale green.

"I . . . I think I'm going to be sick," she told them seriously.

"Well for— Bronson! Quick!" Bronson saw and heard and went into action. He whirled from the control panel and kicked open an emergency floor port. Commander Barnes rushed Myrna to the port and held her head. For a tense moment they all waited. Nothing happened. Myrna straightened up.

"I guess I'm not going to be," she decided.

"Well, don't scare us like that," Barnes pleaded.

"I'll try not to," Myrna promised. "But what was the idea of all that violence? Do you always throw your ship around like that just when you're about to come in for a landing?"

"No," Barnes shook his head soberly. "I don't. I'm very much afraid that bit of maneuvering was Complication No. 1 setting in."

"What do you mean?"

"The valley bottom is too soft to support our ship even with the weight spread out by the repulsor field."

"But the *Pinnafore* seems to be all right," Myrna pointed out.

"Maybe it's just sinking slowly; besides a passenger and freight liner has more air space in it than a salvage ship. When the *Pinnafore* came down most of its fuel was gone. We've still got more than half of our fuel as well as all our salvage equipment."

"You mean we can't land?"

"Not in the valley bottom. We'll have to cut us a hole in the side of the valley. Bronson, get Stevens and a landing crew ready with mining equipment."

"Yes, sir." Bronson departed and Barnes turned his attention to the controls. He started dropping the ship down into the valley again, edging in along the west wall. It wasn't quite so precipitous as the east side. He nursed the ship along at dead slow, looking for a piece of valley-side that made some pretense of being level. He found a spot, almost opposite the stranded *Pinnafore*. The mountain wall leveled off slightly in a sloping bench before it made its final plunge to the valley bottom. Myrna watched and marveled at the deft skill with which Commander Barnes' lean, powerful hands operated the controls as he inched the big ship down with infinite, tender care. He had reason to be careful, the lives of the whole crew were literally wrapped up in the two-hundred-foot metal hull. Once that much tonnage started moving it required power and space to stop it.

WITH A resonant *bong* the repulsor field indicators sounded solid contact at two hundred feet. Commander Barnes' hands at the controls eliminated all forward motion and the ship floated over the sloping bench, the mountain wall rising sheer outside the right-hand ports. He cut in communications.

"Bronson."

In a few seconds the first mate's "Yes, sir," came through.

"Stand by to land your crew and equipment. We're going down."

Slowly the ship began to settle as the commander carefully decreased the extension of his repulsor field. The sound of the indicators climbed steadily up the scale, then more

slowly as Barnes nursed the ship almost imperceptibly lower. Myrna watched through a floor port and saw the tangled jungle of trees and vines heave and writhe and bend, finally collapsing under the crushing pressure of the ship's weight transmitted through the repulsor fields.

The broken, tangled wreckage of underbrush was still six feet away when Commander Barnes eliminated the descent.

He snapped the communication switch. "O. K., Bronson. Midships repulsors cut."

Myrna moved to the observation wing of the control cabin and looked toward midships. She saw a section of the crushed foliage recover somewhat and the areas fore and aft pounded more solidly into the ground as the bow and stern fields took up the burden of the midships field. A hatch opened in the curving side of the ship. Nine men climbed out and dropped into the angle of broken greenery. Five of them carried the indispensable atomic flame projectors, the other four were burdened with small, round kegs of explosive. They were all clad in overall suits stopped by globular, cello-glass helmets, a precaution always taken in new country until an analysis of the insect population could be made. The men scrambled over the broken brush away from the ship.

"All ashore, all clear," Bronson reported through his helmet transmitter.

"O. K. Going up," Commander Barnes warned and threw full power into the fore and aft repulsors.

The salvage ship bounded skyward, the repulsors were cut, the drive switched on and the *HS14* surged forward up to flying speed before it lost its upward momentum. Barnes swung it in a slow circle out over the valley and back again.

Occasional brief puffs of smoke burst up from the bench as Bronson and his crew eliminated some of the debris of wreckage foliage that interfered with their operations. The first mate reported in.

"All set sir. Come and get us."

Commander Barnes acknowledged and brought the ship in along the west wall again. As they approached Myrna saw Bronson and his men scrambling up the side of the valley above the bench. The ship descended rapidly and stopped almost in contact with the ground. The mining crew clambered aboard as soon as the midships repulsor fields were cut and the ship immediately bounced skyward again. It slid off the top of its rise and swung out over the valley.

Stevens, the ballistics expert entered the control cabin. He was dark and heavy and rounded with the smooth, deceptive muscles that look like fat. His movements were slow and deliberate and he never made the wrong one. In his life as a master of ballistics he had handled enough concentrated power to wreck half the Solar System and in that business one mistake was all that anyone made. He moved to his panel of remote control firing switches. He studied them a moment, selected five and closed them.

Barnes, Myrna and Bronson were watching the west valley wall. They saw the surface of the bench burst outward with a slow heave and tumble with simple completeness down into the valley. That's all there was to it. The strength and inertia of the rock had been perfectly matched by the power of the explosive. The result was a clean, square-cut step in the side of the mountain.

The *HS14* settled into its new berth as fussily as a she-elephant bedding down for the night. At ten

feet the hydraulic landing jacks shot out and a landing crew climbed out under the ship to bed them into the granite. Commander Barnes, seated at the control panel moved and shifted and varied the intensity of his repulsor field distribution in response to the movements of Bronson and his crew beneath the ship. He had set this ship down dozens of times, but it was always a ticklish proposition; he didn't have to make much of a mistake with his weight distribution and the balance of his field patterns to drop the ship or roll it sideways. A hull of that size could do a lot of damage to itself by falling ten feet, to say nothing of the crew laboring underneath. For half an hour the nerve-racking business continued and Myrna felt vividly the controlled tension that gripped every member of the crew. Then Bronson reported all the jacks solidly bedded.

SLOWLY, carefully, Commander Barnes started to transfer the weight of the ship from the repulsor fields to its new foundation. He sat tensely, ready to counteract any unbalance or lack of support with the repulsors. Myrna saw showers of chips burst up from several of the jack footings as they took the load, but they were sunk a foot deep in new granite and didn't give a fraction of an inch. Barnes cut the repulsors entirely.

"How does she look from the outside?" he inquired.

"She's sitting pretty," Bronson replied.

"O. K. Come aboard." Commander Barnes got up from the control panel and stretched to get the cramps out of his long body.

"Well, we're down. Now what?" Myrna inquired.

"Don't you think that's enough for one day?" Barnes asked.

Myrna looked out of the port and

noticed for the first time the gradual fading dusk of a Venusian sundown that was shading across the valley. She looked down a hundred feet to the level, green valley floor that stretched away from them to the looming bulk of the far wall. Somewhere in between was the derelict *Pinnafore*, but the evening mists were wreathing down, they'd lift later into the translucent clearness of a Venusian night. Commander Barnes stood behind her at the port.

"It's great country," he suggested.

"It's marvelous." Myrna sighed softly.

"Yeah. Well, uh, we'll go and see what's the matter with the bottom of that valley tomorrow. I'll show you your cabin if you like," he said abruptly.

Myrna went to sleep that night dreaming of vast mountain ranges that towered past the sky. The last thing she remembered was wondering what lay beyond.

In the morning with the mist crowding close, blanketing visibility down to twenty feet, Commander Barnes checked his overalled and helmeted landing crew out of the ship.

There was one small one too many. He stepped over to the offending figure and saw the dark glow of Myrna's hair filling the transparent helmet.

"You can't come with us," Barnes stated bluntly. There was no diplomatic way of putting it.

"Why not?"

"This is new country; it may be dangerous."

"Well, it won't pick on me particularly; it's just as dangerous for you and your men, and you're going," Myrna pointed out reasonably. Commander Barnes didn't know it, but he was confronting a problem that had been worrying the males of his

species since the beginning of time. What to do with a persistent female who insisted on tagging along? He solved the problem in the traditional manner.

Ten men and one girl started to clamber laboriously downward through the matted tangle of green jungle that hung on the steep slope. Even with the help of the projector flames, it took half an hour to cut their way through the resilient toughness of the lush growth. By the time they had descended the one hundred and fifty feet to the edge of the valley floor they were sweating and feeling uncomfortably sticky. Myrna hinged back her helmet to wipe her face. Barnes reached over and slapped it shut again.

"You'll wait till we find out what flies and bites around here," he said. Myrna glanced quickly around. None of the men, seen dimly through the clinging mist, had opened their helmets. She said nothing. If they could take it she could. She blew upward at a droplet of sweat that tickled maddeningly on the end of her nose. Then she heard Commander Barnes' voice giving orders:

"Jenson, take your bug trap along the edge about fifty yards and find out what lives here. Martin and Blake, give him a hand."

The little entomologist shouldered the pack of his vibro insect attractor and followed north along the narrow trail that Martin and Blake started cutting through the heavy growth. In a moment the mist closed round them and the only evidence of their existence was the continuous spluttering crackle and flare of the projector flames lighting up the mist blanket.

Under Bronson's supervision two of the men set up a radio-beam direction post. They lined it up carefully with the compass bearing of the

Pinnafore, turned on the power and they were ready to go. Commander Barnes led the attack on the jungle growth along the line of the radio beam. The flames of the atomic projectors cut out matted masses of vines and spindly tree trunks that seemed to have concentrated all their energies on upward growth. The men behind pulled them back, cut them into shorter lengths and bedded them into the bottom of the trail that rapidly became a tunnel through the wall of greenery. For a hundred yards it led slightly downward, then it leveled off abruptly, and as abruptly the character of the foliage changed completely. The luxuriant tangle of matted vines ceased and was replaced by the austere, columnar growth of huge reedlike plants that towered up into the hanging mist.

Barnes stopped and the rest of the landing party crowded up the trail behind him. Myrna crowded in beside Commander Barnes and looked. She felt it, too, the sinister air of mystery that hung about these aloof, gray columns of growth that looked as though they had been there since the beginning of time. They were scaled and ancient; somehow they seemed eternal. Myrna had an uneasy feeling that it would be some kind of sacrilege to touch them. For a long moment the whole crew stood there in the silence and the mist. Commander Barnes broke the spell.

THE SEARING projector flame lashed out and the nearest of the six-inch trunks was sheared neatly off. It stood a moment, erect on its stump. With a rush of air like a weary, dying sigh it fell gently down and lay among its fellows. The finely tasseled leaves that crowned it lay limply on the ground like the gray beard of an old, old man. Myrna

swallowed a lump that had risen in her throat. It was silly to feel like that about a plant. You had to be tough in this salvage business. Besides, others were going down. Bronson moved up with Commander Barnes and they went ahead rapidly, the huge reeds falling like corn at harvest time.

The reeds were falling and getting smaller as they progressed. The ground underfoot was a soft, humus loam, composed of the fallen tasseled reed crowns, but now moss was creeping in as they advanced. Peculiar, hairy stuff that grew in bunches like green powder puffs. It got thicker and deeper as the reed plants became smaller; finally it crowded them out altogether. They had come to the end of the reed belt. Ahead the moss stretched in a waist-high level plain as far as they could see. The mist was rising, trailing off in reluctant streamers as the temperature rose with the advance of day.

"There it is! Straight ahead," Bronson's voice came over the helmet sets. The mist was rising higher and the light getting better every moment; then they all saw it. A quarter of a mile distant the silver-gray bulk of the stranded *Pinnafore* heaved above the sea of moss.

"Come on, let's go get it," Bronson urged enthusiastically and plunged forward into the moss.

"Wait a moment. I don't like the feel of this ground," Barnes cautioned. "Bring a line. I'll try it out."

Bronson made the line fast and payed it out as Commander Barnes started off slowly plowing a careful course through the deep moss. The ground felt a little shaky underfoot but it seemed solid enough when he stepped in the middle of moss clumps.

He reached out and stepped into the middle of a solid-looking clump and plunged abruptly through. He threw out his arms and yelled instinctively. Something heaved up under him, he heard a grunt and a screaming squeal, he got a blurred impression of a huge gob of mud leaping up and bounding away through the moss clumps, then he was skidding backward through the moss and mud as Bronson and the rest of the crew hauled in on the line.

Willing hands hoisted him to his feet, but he couldn't see anything through the layer of mud plastered all over his helmet.

"Hold still till we get this mud off," a feminine voice ordered.

The darkness vanished as the helmet was wiped clean. The first thing Barnes saw was Bronson's worried mug.

"Yeah, and you're the guy that said this prospect looked good," Commander Barnes accused.

"Well, it did look all right from above," Bronson defended himself. "Did you get a look at that thing that jumped out from under you?"

"Sure. I saw it through about a foot of mud."

"It looked like a cross between a kangaroo and a walrus," Myrna supplied.

"What did you say, sir?" Bronson asked.

"I said, with a female biologist and a lake of mud this is going to be one sweet jog."

"Yes, sir," Bronson agreed.

"I guess we'll have to build a bridge of some sort."

"Yes, sir. It looks that way."

"We could use the reed plants," Myrna suggested.

"Yeah, I guess we could. Get going on it, Bronson. Come in Parker," he said to his transmitter.

"Yes, sir," Jurd Parker's eternally

weary voice crawled out and lay down in response.

"Get Atkins."

"Yes, sir."

"Atkins reporting."

"Get the repulsors off the derrick in the repair shop. Switch them to beam-power pickup and bring them down here."

"Yes, sir. Immediately, sir. Anything else, sir?"

"No, that'll be all for the moment." Barnes switched off hurriedly. Talking to Atkins always made him feel that he was just a little bit behind everything. That guy was so fast he was going to catch up and run over himself some day.

"Calling Commander Barnes." That was Jurd Parker's voice.

"Whatsamatter?"

"Two ships just went east about fifty miles south of here," Jurd announced. "They were flying dead slow and they must have been low. I picked up their repulsor field interference."

Barnes considered the information a moment. "There's nothing very remarkable in that," he said finally. "Ships do fly over this country occasionally."

"Yes, sir," Jurd agreed submissively.

"But if any others do, I want to know about it," Commander Barnes instructed.

"Yes, sir. I thought you would, sir," Parker acknowledged. "I've got all my detectors operating. I don't think anything can creep up on us."

"There's no reason why anything should. We're here on a perfectly legal salvage operation," Barnes told him sharply.

"Of course, sir," Jurd agreed.

"You can keep the detectors operating," Barnes added as an afterthought. "Get me Jenson."

"Dr. Jenson reporting."

"How's the bug hunt going?"

"Splendidly, splendidly!" Dr. Jenson told him enthusiastically. "I've caught two specimens of the rare giant blue aphid. They're perfect specimens. I—"

"Is there anything bad?" Barnes cut in.

"No, just the usual; but these specimens—"

"That's all I want to know," Barnes muttered as he cut off the circuit and opened his helmet. Myrna did likewise.

"Do you think those were Hertz ships?" she asked.

"Pretty well sure to be. They'll get here sooner or later. It shouldn't take them long to duplicate your deductions."

"Can they do anything?"

Barnes shrugged. "I don't know. Our best bet is to grab the loot and skip before they show up."

A VIOLENT commotion in the jungle toward the shore line heralded the arrival of Atkins. He hove in sight riding on top of the two repulsor units from the repair-shop derrick and using two flame projectors for a drive. He landed his bulky equipage near where Bronson and his men were laying waste the reed forest. In a few minutes the first load of reeds was dumped on the edge of the moss belt and construction started. Parallel lines of long reed trunks were laid down and shorter lengths lashed across them. The construction was simple and went fast; the bridge crept steadily out through the deceptively solid-looking moss clumps and across occasional bare patches of slick black mud. Twice it was wrecked by the violent eruption of the type of creature that had spilled Commander Barnes.

Myrna's analysis was essentially correct. The things weighed somewhere between eighty and ninety pounds. They were covered with a sleek coat of green-and-blue fur that shed the sticky black mud as though it were water. There was plenty of power in their hind legs. Bronson found that out. The second of them burst through the bridge and right into his arms. The big first mate grabbed it and held it for a part of a second, then he received a kick in the middle that sprawled him in the mud and it was gone, leaping and yelling and screaming over the moss clumps.

For a moment there was silence following the uproar. Then a long, babbling howl burst out. It ululated eerily out of the deep moss to the north. There was a compelling note of command in it and in response half a dozen more of the mud creatures struggled industriously out of the mud in the area between the end of the growing bridge and the huge, silver-gray hull of the *Pinnafore*.

"They seem to be harmless," Barnes suggested as he helped Bronson back onto the bridge.

"And intelligent; they're getting out of our way," the first mate added grimly.

"That sound was controlled by lips," Myrna remarked authoritatively.

"So what?" Barnes asked.

"That's what I studied, primitive languages. It wouldn't be hard to break this one and find what it's all about."

"It might be interesting," Barnes agreed. "Too bad we haven't time to go into it."

The last fifty yards to the stern of the *Pinnafore* was rapidly being bridged. They ducked as Atkins rode the repulsors by overhead traveling down the power beam with

another huge load of reed trunks. The crew was beginning to get good at their primitive carpentry, it took only ten minutes to finish the job.

Myrna, Barnes and Bronson stood under the silent exhaust tube of the derelict ship.

"Well, let's go aboard," Myrna urged.

"Give me a hand," Barnes instructed.

Bronson hoisted his commander up into the tube, then Barnes turned and hauled the first mate up beside him. Myrna came next. The three of them clambered around the lip of the tube onto the top of the hull. At first glance the ship looked to be in perfect condition, but a closer scrutiny revealed signs of the baking it had been subject to in its uncontrolled plunge through the Venusian atmosphere. The flexible silica varnish had fused and run in several places and the metal was deeply corroded beneath. Bronson kicked at one of the spots experimentally. The metal sounded solid.

"Not bad, not bad," Barnes commented. "The cargo should be in first-class shape. Come on, we'll go and take a look at it." The rear lifeboat lock was open but the inner door was heat-warped and jammed shut.

"We'll need a projector for that," Barnes decided, scrambled back over the hull and yelled below. He caught the projector that was heaved up to him and returned to the lock. In a few seconds he had the door cut right out. He stuck his head inside and sniffed. The air smelled stale, but that was all. He stepped inside. The atomic-powered lights were still burning brightly.

"Watch the edges of that door; they're still hot," he warned as the others followed him.

They started down the corridor

through the passenger cabins. Their feet made no sound on the resilient floor covering; the ship was utterly still, they could hear each other breathing. Instinctively they kept close together. Commander Barnes led the way forward to the control cabin. Everything was in perfect order as though Commander Nordune had just left, they wouldn't have been very much surprised if one of the *Pinnafore's* crew had entered. Barnes went straight to the chart table. He dug down in a drawer underneath and came up with a sheaf of cargo plans, one sheet for each deck.

"These are what we want," he said. "Look through them."

BRONSON and Myrna accepted their share and for a few moments the rustle of paper was the only sound in the cabin.

"This must be it," Myrna announced. There was an edge of excitement in her voice. She laid a plan on the table. "It's the bottom deck," she explained. "There's a space labeled Venus Consolidated with no detail of what's in it."

"I guess you're right," Barnes agreed. "Let's go." They were getting close to the end of the trail. He felt a little excited himself. They left the cabin and started down the emergency stairway that communicated between decks. Their feet made a clattering clamor on the steel steps.

"Go on, hurry up," Myrna urged.

"Don't shove. The cargo will wait." He sniffed; a stale smell was drifting upward. They reached the stairway leading to the bottom deck. Barnes stopped.

"Oh, oh."

"What's the matter?" Myrna crowded past him. She saw what was wrong. The stairway disap-

peared into the slick black gleam of a pool of mud. As they watched a moment in silence they saw the mud wasn't still. It was oozing slowly up through the hatchway. Bronson spoke.

"The bottom must be torn out!"

"The whole bottom deck will be full!" Myrna cried in consternation.

"Where the devil's that hatch cover?" Barnes demanded. "Come on, Bronson, give me a hand." Together they lifted the heavy plate off its rack on the wall and heaved it into position over the stairway. It slithered around on the rising ooze of mud and wouldn't go into place. They threw it clear.

"Dig some of this mud out," Barnes instructed. There wasn't time to call more of the crew; mud was coming in every second. They tore into the job furiously, using their hands and slinging the mud indiscriminately all around the stairwell. Before the hatch cover was bolted into place they were a mess.

Myrna sat back on her heels and wiped a gob of mud off her face. She was breathing hard from her exertions.

"What are we going to do now?" she asked in dismay. A few seconds ago everything seemed to be right in their hands.

"I dunno, yet," Barnes shrugged. "This is going to take a little thinking out. Any suggestions, Bronson?"

The first mate shook his head.

"Are you below there, sir?" That was Atkins' voice.

"Yeah, come on down," Barnes invited. Atkins came down the steep stairs. He stopped and blinked in surprise at the mud-splattered figures.

"Something the matter?" he asked uncertainly.

"No, there's just a hole in the bottom. We plugged it here," Barnes

explained. "What's on your mind?"

"I've been in the generator room. The power plant is all right, all the repulsor activators respond."

Barnes stood up and rubbed the mud off his hands. "What about the drive manifold?"

"It's not bad. It would take perhaps a couple of days to fix. We don't need the refrigerators."

Barnes thoughtfully rolled the mud on his hands into a ball and tossed it on top of the hatch cover. It landed with a *plop*. He shrugged his shoulders.

"I guess that's the best we can do," he said to Myrna.

"Do you think we can lift out of this mud with the repulsors?"

"I don't know. We can try. There's maybe a chance; this ship isn't quite so massive as the *14*."

"I guess we better go ahead then," Myrna agreed not very enthusiastically. All the excitement had gone out of her. It seemed that they were just as far away as ever from the treasure that lay in the hold of the *Pinnafore*.

"All right, Atkins; get busy on your survey and make it fast," Barnes instructed.

"Yes, sir." Atkins was expecting the order and took it on the run.

"Would there be any chance of pumping that mud out and salvaging the drill heads if the ship doesn't lift?" Myrna asked when Atkins had gone.

"We've got nothing to pump with," Barnes told her. "It would take longer to build a pump than it would to fix up the drive manifold. If the Hertz outfit shows up with equipment to handle this job, they can overrule our salvage claim. Our best bet is to see if the repulsors will lift us just enough so we can boost up to the north end of this valley with the drive. I was looking at the

photographic flight record last night. There's a big, flat stretch of reed plants and jungle to the north; likely the mud's shallower there. If we can get some solid underneath, we can lift easily."

"Is there anything I can do to help?" Myrna asked.

"No, I guess not. This might be a good chance for you to get acquainted with those mud gophers outside," Barnes suggested.

"You mean keep out of the way; you're going to be busy," Myrna translated with a smile. "All right, I'll make myself scarce."

They went back to the upper deck. Commander Barnes headed aft to look at the drive manifold and Myrna went in search of the forward escape lock. That was practically the last they saw of each other for the next two days.

THERE WAS a crack six feet long in the drive manifold. The failure of the heat-resistant inner lining of the manifold had subjected the outer covering to the terrific temperature and corrosive action of the preheated fuel. The metal ten inches on each side of the rupture was completely broken down and crumbled at a touch. It had to be all cut away, the undamaged metal cut back several inches and undercut to give a firm anchorage for a weld. The split in the inner lining was only three inches wide, but because of the stubborn, ornery toughness of the refractory alloy with which it had to be repaired, it presented the major problem. Before the job was finished, Atkins' vast reserve of profanity was running low; once or twice he actually repeated himself.

For two days and nights Barnes saw nothing of Myrna or the soft gray-green beauty of the valley. His world was made up of the intermina-

ble, intermittent spluttering flare of atomic flame projectors and the sullen, reluctantly yielding toughness of the Malat metal lining.

Twice Jurd Parker reported ships passing, once fifty miles to the north and again to the north but twenty miles closer. On both occasions Barnes ordered the immediate cessation of all work and the shutting down of everything that might create detectable radio interference. He didn't explain his actions to anyone, but the men began to get the idea that there was something secretive about this salvage operation and, somehow, a time limit had been set. By the time the job was done a tense, nervous excitement gripped the whole crew as they waited for the results of the work to be tested.

At last Atkins was ready to start his preheating tests and Barnes suddenly found himself with nothing to do. He was utterly tired but not sleepy yet; that would come later. He went to the forward control cabin and saw someone below on the reed bridge that had been extended all around the *Pinnafore*. The preliminary evening mists had lifted, there was enough light for him to see it was Myrna. He went out through the forward escape lock, slid down the curve of the hull and landed beside her.

"*Ssh,*" Myrna cautioned. She was sitting and didn't get up. She was holding something in her arms. It squirmed and emitted a sleepy whimper as Barnes landed on the bridge.

"What the dickens you got there?" he asked in a hushed voice.

"It's a baby mud gopher," Myrna explained. "I'm holding him while his mother dives for moss roots."

"Holy gosh! You must have got on pretty well with them if they let you handle their young."

"It wasn't hard. I can speak most

of their language now. It's very rudimentary, and they're so gentle and tame. They're quite intelligent, too, and they've got as far as tribal organization. The various tribes seem to get along without any trouble. There's lots to eat. And they've got the loveliest dark, velvet eyes. Just lately, though, they seem to have been worried about something. There's been more of them coming south all the time; the moss out there is just crowded with them. There's lots of babies, too."

"Maybe they just like to raise the kids down this end of the bog," Barnes suggested.

"No, it's not that. I think there's something to the north they're afraid of." Myrna stopped speaking and they listened to the night sounds. A subdued murmuring rose out of the translucent dark from the moss all around where the strange mud gophers lay concealed in their thousands and carried on the diminished activities of night. Suddenly, high, shrill and sweet the wild, uncanny mating call of a killer moth wove a thread of exquisite, fading melody into the night. A flock of gliding lizards was disturbed high up on the slope of the mountain; their sharp, raucous barks drifted distantly from the shore. The weird mystery of North Venus hung over everything.

Myrna looked up at Commander Barnes.

"Don't you feel it?" she whispered. "I know something terrible is going to happen." She hugged the tiny mud gopher in spite of his sleepy protest. "There are thousands of them out there in the moss and they're all afraid."

Barnes looked down at the girl as she sat with her arms cradled, her face silhouetted dimly white against the background of the moss swamp, her hair a dark cloud above it. She

was right, he certainly did feel something, and if he wasn't careful, something was most surely going to happen.

"Well, whatever it is I hope it doesn't happen yet awhile," he said, matter-of-factly getting safely down to reality. "I've got to get some sleep."

Myrna was silent for a moment. "I guess you need it," she agreed. "How's the drive coming?"

"We're going to try a take-off in the morning."

"And if you don't make it?"

"We'll figure that out in the morning, too. Do you think you could warn these mud hoppers to get out of our line of flight. I'd just as soon not slaughter the whole crew if we don't have to."

"Oh yes, I can do that," Myrna said. Without warning, she raised her voice in a high, babbling yell. The baby mud gopher in Myrna's arms sat up with a startled "Wouup!" of surprise, then it started yelling on its own account, a piping wail of distress that sounded like a human baby crying. Myrna spoke softly to it and stroked it and soothed it till it quieted down to a subdued whimpering complaint against the world in general. Silence settled down over the swamp again.

The baby mud gopher refused to cuddle back to sleep but sat alertly erect, its short, silkily tufted ears cocked forward, its tiny black, button nose twitching as it sorted the night air. Suddenly it stretched its stubby neck out as far as it would go, pursed its soft black lips and sent a low, crooning cry out into the night. An almost identical answer came back.

"That's his mother," Myrna explained softly. "She's quite a big shot in the tribe."

WITHOUT a sound four full-grown mud gophers emerged dimly from the moss and sat up, looking toward the ship in silence. Myrna spoke a few soft, vowel-filled words. One of the gophers answered, and they all waddled across the mud with great dignity and climbed up on the bridge. They sat in a line, alertly erect on their long hind feet, their tufted ears cocked straight up and their short forepaws folded on their round furry bellies. They glanced once at Barnes, then all eyes were focused expectantly on Myrna.

As a preliminary she handed the baby over to the biggest of the four, then started speaking quickly and earnestly in the simple, melodious language these strange creatures had developed. They listened in solemn, attentive silence, glanced up at Commander Barnes, then looked for a while at the bulk of the *Pinnafore*. The big old matron with the infant seemed to be the leader of the group. She puffed out her cheeks and spoke, her voice a surprisingly rich, musical contralto. Myrna answered quickly; she supplemented her words with expressive gestures and repeated most of what she had already said. The four sat motionless, their tufted ears intelligently erect, their beautiful soft, dark eyes missed nothing.

When Myrna finished, they sat in silence for a long moment, then the old matron crooned a long, low "Ooooo." Evidently that meant they got the idea. She placed her baby on the back of her neck, it got a firm hold on the tufts of its mother's ears, then she led the way back toward the moss. The gophers seemed to waddle clumsily, but they made no sound on the soft mud. In a surprisingly short moment they vanished silently into the long moss. Sounds ruled the night again, nothing moved. Myrna started to get

stiffly to her feet. Barnes helped her up.

"That's the best I've been able to do with them so far," she said with satisfaction.

"Well, we'll see how good it is in the morning. I sure hope the repulsors can find enough solid. If we could go back to Venus City and get some salvage buoys, it would be no trick at all to raise the ship and blast her north to the shallow end with the drive."

"We can go back," Myrna assured him, "but I don't think the Madden credit would stretch as far as even a small buoy."

"That seems hard to believe," Barnes objected.

"Well, it's so. All we've got is here. Then there's that little item of some administration men who got scattered around. It's going to take a bank roll to square that."

"Meaning we've got to raise the *Pinnafore* or else," Barnes concluded. "And we've got to do it first time. If those Hertz ships are anywhere around when we cut loose with the repulsors at full power, they'll track us down in no time. If we can't handle the job and they can, it's their ship."

Myrna nodded. "I know," she said, "but if there's nothing more to be done tonight you'd better start thinking about that sleep you mentioned."

Barnes suddenly realized that he was quite prepared to curl up and sleep on the mud if necessary. "I'm ready for it," he admitted.

They went along the reed bridge to the stern of the ship and entered through a cargo port. Barnes was practically out on his feet when he reached his cabin. He managed to mumble a good night and was asleep almost before he landed on his bunk.

Myrna went to her own cabin, but

she didn't sleep much. The murmuring mutter that rose from the moss swamp seemed to be increasing in volume, it hung heavily like a tangible pall of fear over the night-filled valley. Myrna was sure it was hopeless, resigned fear she had seen in the dark, tragic eyes of the mud gophers. She had heard some hint of it in their talk; they would tell her nothing directly. They seemed absolutely sure it would be no use, that nothing could be done for them.

Some time during the night Myrna was startled vividly awake to hear the last of a ghastly, semihuman scream of mortal agony and terror drifting across the swamp from the north. A cold sweat broke out on her as she sat awake, dreading to hear it again. She started to nod, her eyes drooped shut, then with brutal suddenness the nerve-tearing sound ripped out and died slowly away. She sat tensely awake and heard the voice of the hordes of mud gophers increasing in intensity, building up with a heavier background of sound. For some reason they were drifting south in their thousands, fleeing from the horror that lay to the north. If the screams she had heard were any part of the mystery, Myrna found she could hardly blame the mud gophers for moving out. The second time she woke she did not attempt to go back to sleep again, but lay awake, listening to the tiny voices of the derelict ghost ship.

It was still sinking slowly, the plates and girders of the hull subjected to unaccustomed strains muttered and whispered in low-voiced protest.

AT LAST the morning mists began to wreathe down, laying a soft, smothering blanket over everything. All sounds were muted, some were

stilled. Then the ship began to come to life, sounds of movement came from other cabins; finally a succession of musical chimes on the communication system announcing breakfast restored the world almost to normal but not quite. The augmented murmur from the increasing hordes of mud gophers remained as a steady, ominous background.

Barnes and Bronson were in the control cabin checking instruments when Myrna got there. Lights were on; the lifting mist still hung low outside.

"Good morning," Barnes greeted. "It looks like Madam Mud Gopher did her stuff all right. As far as we can see the moss is clear ahead of us, but there's crowds of those things everywhere else."

"Yes, I know. I heard them coming in last night," Myrna said. "Are we about ready to try the repulsors?"

Barnes nodded. "Everything's set. We've even got the fuel tanks about a third full in case we do get off. Atkins is making a final check-up; we're just waiting for him to report."

The communications speaker beeped warningly. "Atkins reporting. Everything O. K. Let her flip."

"Going up," Barnes warned hopefully, and eased forward on the repulsor controls. The dials responded evenly. He advanced the controls cautiously to the limit of the first stage and gave the generators plenty of time to take the load. Atkins had left the communications system open. They could hear the deepening note of power from the generator room.

"Are they taking it all right?" Barnes asked.

"Everything's normal," Atkins replied.

"Well, this is it," Barnes muttered. He shoved the repulsor controls to full power and full extension. They

heard a series of quick, heavy thuds from the generator room as the overload coils were switched into action. The cabin lights dimmed down, then brightened again as the generators built up to speed. It was a little more than three seconds before they were pouring full power through the repulsor fields. The ship shuddered and heaved. The group in the control cabins stood tense, silently, expectantly waiting. It was lifting! They could feel it. They looked at one another in the beginning of triumph. The ship was coming up! A foot. Two feet. It rose a few inches more, then the altimeter refused to advance any farther. The generators moaned steadily at full potential.

"What's the matter?" Myrna asked anxiously.

"No solid," Barnes replied briefly.

"That's all you'll get out of it," Bronson stated flatly. "The mud's beginning to boil out there." He nodded toward a side port. Myrna looked. Under the trailing skirt of the mist she could see the slick, black roll of the mud as it began to boil up sluggishly at the outer edge of the field.

Barnes hung on hopefully for another ten seconds, but the ship would rise no more. The mud was rolling and boiling all around and building higher. Then the ship began to settle almost imperceptibly back as the terrific power of the repulsors displaced the mud.

Commander Barnes didn't dare delay any longer. He fired the drive, then firmly and steadily advanced the throttle to full open. The drive muttered and rumbled to a crescendoing thunder of power. The ship surged forward with a rush, then slowed, but kept going. Barnes didn't want to admit it, even to him-

self, but he knew they weren't going fast enough. An indicator on the way up caught his eyes. It was stern exterior temperature, rising fast.

"I guess the blast isn't clearing, the mud must be blanketing it in," Barnes muttered.

Atkins' voice came in, calmly tense. "The emergency stairway hatch has torn loose. Mud's coming in," he announced.

"See what you can do to fix it," Barnes instructed. In that moment he knew they were licked. Suddenly the exterior temperature indicator glowed a warning red and emitted a series of sharp, penetrating beeps. Reluctantly Barnes retarded the throttle a little. Almost immediately forward motion ceased. He cut the drive completely, the red glow began to fade out of the temperature-indicator dial. He had come pretty close to melting the stern off the ship. The moan of the generators came into the cabin again. He started to cut the repulsors and the ship settled slowly back into the mud. The voice of the generators dropped and faded out. For a long moment the sucking noises as the ship settled down and the mud oozed back were the only sounds to be heard in the cabin. Barnes neutralized all controls.

"We didn't make it," he said, dropping the remark into a silence full of disappointment.

"I guess that's that," Myrna managed to say, and bit her lip to keep it still.

BARNES' mind was a blank. He had considered possible failure, but he hadn't thought much past it. He cut in communications absently. "Come in, Jurd," he said.

"Parker reporting." Jurd Parker's voice was as weary as ever.

"Has anything been near in the last half hour?" Barnes asked.

"I thought I picked up something about seventy-five miles south," Jurd told him. "I thought it sounded like repulsor interference. You blanketed everything out before I could be sure. If it were repulsors, the ship that was running them would have a job picking up our direction over his own interference," he added.

Barnes blinked alert. He hadn't thought of that. "I guess you're right," he agreed. "O. K. That's all." He switched off.

"They might not have spotted us to within a few miles," he told Bronson and Myrna.

"So what?" Myrna asked.

"So we might have time to build a mud pump before Hertz can get here with better equipment."

Myrna looked at him steadily. "Salvage men don't give up easily, I see," she said quietly. "I guess it won't do any harm to build pumps up to the last minute."

Barnes contacted the generator room. "Atkins."

"Yes, sir."

"Can you build a mud pump?"

There was a few seconds of silence. "Well, yes, sir; I guess so."

"O. K. Fly at it, and do all your cutting with the torches."

"A projector would be faster for rough cutting," Atkins pointed out.

"And noisier. Don't use one."

"Don't—"

"Exactly."

The pause that followed was so eloquent that they could practically see Atkins flip his eyebrows resignedly.

"Yes, sir," he said, and switched off.

"Why not the projector?" Myrna asked curiously.

"If those Hertz scouting ships miss us, they'll miss pretty close," Barnes

explained. "The disturbance of a single projector flame can be picked up ten miles off."

"Oh, I—" Whatever Myrna had

been going to say was cut short by a terrible scream of unutterable agony that wailed out of the moss swamp not far to the north. The



"Mud! We can't lift this ship out of here with nothing but mud for the pressors to work on, and this cargo of mud to lift."

nerve-numbing cry of pure, distilled terror rose incredibly, then abruptly cut off, but it still seemed to continue, burned indelibly into the memories of those who heard it. They looked at each other in horrified silence.

"Wow!" Barnes let his breath go. "That's the worst I ever heard."

Myrna shivered. "I heard it twice last night, but it was farther off."

The communications speaker buzzed. "Parker calling Commander Barnes."

"Go ahead."

"A ship went by about eight miles south on atmospheric controls. Not using his repulsors. He must be listening."

"O. K. We'll keep quiet." The speaker switched off.

Bronson rubbed his hand over his forehead and blinked. "Boy! If I never hear a yell like that again, it'll be too soon. I wonder what the devil it was?"

His face paled, they froze and stared at each other as the scream came again. It was different, lower-toned, closer, more desperately urgent. It choked off abruptly.

Barnes shook himself and shuddered. "Come on, we'll go see," he said briefly.

They followed him out through the forward escape lock to the outer hull of the ship. The *Pinnafore* had moved no more than a hundred feet north as a result of the morning's session of roaring and blasting. It was sunk about four feet deeper in the mud and was beginning to look more than ever like a permanent section of the landscape. Below them several of the men were busy repairing the reed bridge and connecting it up to the ship's new position. They glanced uneasily northward from time to time.

THE MORNING MISTS were lifting and dispersing, visibility was improving rapidly. A peculiar rushing rumble of sound drifted out of the mist. The three on top of the *Pinnafore's* hull didn't see the gophers at first; the blue-green fur of the mud dwellers was perfect camouflage in the moss. Only their movement revealed them, and that almost didn't. They were massed in solid phalanxes and their slow, southward drift was like wind in the moss.

"It's all gophers—there's no moss!" Bronson blurted. Barnes could hardly believe his eyes. A solid stream of the furry mud gophers, hundreds of yards wide was heading south, waddling and humping and leaping along out of the mist in the first semblance of panic.

They were a couple of hundred feet from the bridge. The men working on it couldn't see them, a screen of untrampled moss still intervened.

"You men below, come aboard!" Barnes shouted. His words were followed by another long drawn-out scream of agony. The men on the bridge didn't hesitate; they scrambled for the cargo port of the *Pinnafore*. They barely got inside before the first of the horde of gophers were struggling over the flimsy causeway. They were moving faster, blind panic getting a better hold. They crowded against the hull of the *Pinnafore*, some tried to climb up and fell back into the accelerating stream. The padding of innumerable long, snowshoe feet on the mud was a continuous rushing sound laid over by the swelling tumult of screams, squeals, deep-voiced moans and the shrill piping cries of the babies, sounding like the wail of lost infant souls. Abruptly the soul-searing, high-pitched scream of agonized death cut chillingly through the tangled blanket of sound again.

"Look!" Myrna quavered and pointed a trembling arm. A mud gopher bounded impossibly six feet above the streaming horde, giving voice to the terrible raving screams of pain. It somersaulted wildly in midair. Something black and horrible, a quarter the size of the gopher, was flung off. They both plunged back into the moving mass of animals and were trampled into the mud.

"My God! That gopher was all torn apart!" Bronson exclaimed in incredulous horror.

Myrna moaned and covered her face with her hands.

"There's the end of them." Barnes voice was tight and quiet, past the peak of horror to calmness. "Look what's behind them."

The solid stampede of gophers was thinning out; the screams of agonized death were an almost continuous, shrieking nightmare of spine-chilling sound. In between the thinning ranks of the gophers they could see the cause of the mad panic. Small, black, shiny, hairless reptilian, rat-faced creatures swarmed among the stragglers, leaping and ripping ferociously at the fleeing gophers. As far as they could see northward under the mist, the trail of the gopher horde was dotted with snarling, fighting groups of the black fiends as they battled each other about the ripped and shredded bodies of fallen gophers. Some of the gophers were fighting back, their powerful hind feet slashing out with deadly accuracy, their short, sturdy forearms strangling and pounding the life out of the terrible little marsupials whenever they could catch the quick-moving, elusive creatures, but they hadn't a chance. While they killed one a dozen others leaped on them from all sides.

Suddenly Barnes missed Myrna,

then he saw her emerge from the escape lock with a projector in her hands. Her face was white and set. She raised the weapon and aimed it purposefully. Barnes yelled and leaped, grabbed the projector and twisted her fingers away from the trigger. Myrna didn't say a word. She struggled in furious silence to get possession of the weapon.

"Lay off!" Barnes yelled. "Listen to reason. You fire this thing off and those Hertz ships will be here in a matter of minutes."

"I don't care! Gimme it!" Myrna gritted, her face white and contorted in a fury of maternal rage.

"Nothing doing."

Myrna didn't waste any more words. She bent and drove her teeth savagely into Barnes' wrist. Commander Barnes yelped and jerked away. Myrna hung onto the flame projector and swung around.

Over her head Barnes saw four mud gophers retreating in a compact group. In the split second he saw them, he recognized the old matron and her three aids that he had seen the night before. They were fighting with strategic intelligence, repelling the constant attacks of the black killers. The old leader still had her baby on her back, but even as Barnes caught sight of the action one of the ferocious marsupials leaped and tore it from her. The mother whirled in rage; in a moment the compact formation was broken, immediate destruction threatened.

With a cursing effort Barnes ripped the projector from Myrna's grasp, aimed and fired in one efficient motion.

"Bronson, go below, get the crew with projectors, every one you can lay your hands on. Get up here and open fire and to hell with the salvage."

MYRNA was getting to her feet. She heard what Barnes said and saw him firing. She beat Bronson into the escape lock by six feet and was the first back with a projector. In a moment she doubled the barrage of flame that Barnes was accurately laying down across the course of the fleeing mud gophers. The old mother gopher recovered her damaged infant and with her three companions fled from the area of flame. A dozen or more of the black killers leaped after them. Myrna picked them off methodically and felt a deep thrill of primitive satisfaction as the projector kicked back solidly in her hands and their black bodies twisted and crisped in the leaping stutter of the flame. They had barely time to screech before they were dead.

Bronson and two more men got on the job. Within thirty seconds twelve projectors were spluttering and stabbing out long, accurate fingers of flaming death from the fore-deck of the *Pinnafore*. Three could have done the job; the twelve turned that section of the swamp into a huge outdoor incinerator.

The black, carnivorous little marsupials kept coming. They knew only one thing, they were hungry and easy prey lay ahead. They had always gone directly for it, their numbers overwhelming any interference, but in this case the interference was a little too drastic. They swarmed on in numberless hordes and died as they came; soon their charred remains were heaped in a ridge across the course of the gophers. The wind shifted and the nauseating stench of their dying drifted in a miasmatic cloud over the *Pinnafore*.

Myrna stuck it out with the rest as they choked and sickened. Their eyes bleared in the drifting smoke till the last of the killers, insane with terror of this unknown and driven ir-

resistibly by the scent of helpless mud gophers ahead, climbed over the funeral pyre of its race and was blasted out of existence by the concentrated flames of a dozen projectors. The screams, yaps and short-cut screeches died into silence. No more came, there were no more, nothing stirred, the acridly pungent smoke drifted slowly.

"Everyone below," Barnes ordered tersely.

They filed silently back through the escape lock and gulped with relief at the breathable, conditioned air inside. The carnage was complete, unequivocally final; there was nothing to be said. Myrna's jaws were set, her mouth sealed against the nauseating tumult within her. She shivered, sat down abruptly on a locker and dropped her head into her hands. Bronson went below to superintend the repair of the reed bridge that the mud gophers had trampled out of existence.

Barnes cut in communications.

"Come in, Jurd," he invited.

"Parker reporting. What happened? I was trying to get through; some local interference blanketed the beam." Jurd sounded almost excited.

"That was projector interference," Barnes explained.

"Projector—"

"Yeah, all twelve of them. Do you think anyone heard us?"

"Oh, no," Jurd replied. "Just everything between here and Venus City."

"Anything close?"

"There's something small coming in from the south. It's about three miles out and traveling fast. It should be here in about fifteen seconds or so."

"O. K.," Barnes said and switched off. Myrna looked up. She had recovered somewhat in the untainted

air of the cabin and didn't look quite as ghastly as when she had entered.

"That's that, then," she said. The time element had been eliminated; there was no chance now of building pumps or considering any other angles.

Barnes nodded agreement. "No solid, no lift," he summed up briefly.

It was a kind of futile end to a gallant gesture, but there was nothing much they could do about it. Myrna noticed his bleeding wrist and started to her feet. She put her hand guiltily to her mouth.

"That was me, wasn't it?" she realized.

"It sure was," Barnes agreed.

"I— Oh, I'm sorry."

"Think nothing of it," Barnes said airily. "It's a nice clean sort of wound. I should have seen your point of view a little sooner."

Myrna swallowed a portion of a wan smile.

"I'll fix it for you," she volunteered contritely.

She got the first-aid kit from a wall cabinet, took possession of Commander Barnes' wrist and swabbed the punctured skin with disinfectant. It stung a little, but Barnes was quite willing to leave his wrist in its present position and let it continue to be stung by disinfectant into the indefinite future. To his regret the activity didn't go on for long. Myrna stuck a self-sealing bandage over the damage and the job was done.

"Does it hurt much?" she asked.

"I can hardly bear the excruciating pain," Barnes told her seriously.

Bronson entered the cabin. "There are about a dozen mud gophers hanging around outside the stern cargo port," he announced. "I think they want you, Miss Madden."

Myrna hesitated a moment. "I guess I better go," she decided.

Barnes watched her as she followed

Bronson out. He felt suddenly alone when she had gone. He got up, went to a forward port and took a look at his future. There were several half-formed dreams to be canceled before they started making trouble. Then there was the little matter of a job he'd have to start looking for with the item of involvement with the administration corps officers offering enough complications to make the matter interesting.

BARNES was snapped suddenly out of his reverie by the roaring rush of an atomic drive overhead. He stepped quickly out through the forward escape lock. The mound of death to the north had quit smoking; there was nothing burnable left in it. He looked up and saw the sleek, streamlined shape of a survey ship going over on its atmospheric wings.

It swung at the north end of the valley and came back mushing along almost at stalling speed, obviously looking the situation over carefully. Barnes stepped back into the cabin, switched on the receiver and in a moment picked up the patrol ship's call. The pilot was busy sending a complete report of their position and the layout of the valley. A brief acknowledgment came back. He heard the patrol ship accelerate, then he saw it pass an observation port, driving south at full speed. He contacted Parker.

"Where did that acknowledgment come from?"

"Away south," Jurd replied. "I think about three hours if it was a heavy salvage ship. They likely wouldn't send one very far north till we were located."

"Likely not," Barnes agreed and switched off. Three hours. That just gave them nice time to get everything cleaned up and aboard the *HS14* ready for a take-off. He

didn't think Myrna would want to hang around and watch the Hertz outfit salvage the *Pinnafore*. Bronson came into the cabin.

"Start rounding up the crew and getting ready to pull out," Barnes instructed.

"Maybe you'd better come and take a look outside first," Bronson suggested. Barnes looked at him. The first mate seemed dazed with the dawn of excitement hovering about his face.

"What goes on?"

"I'm not talking. You better come and look."

"Where?"

"Below, astern," Bronson directed as Barnes followed him out of the cabin. They emerged from the stern cargo port.

"Now what?" Barnes asked.

Bronson pointed. Several of the men were standing idle on the beginning of the new reed bridge. Myrna crouched on the end. In front of her a score or more mud gophers sat in a semicircle facing her. A section of reed trunk stood erect in the mud. As Barnes watched, it wiggled and swayed, then disappeared slowly downward into the mud.

Barnes blinked in astonishment. "Say, what—" Then the phenomenon explained itself.

There was a commotion in the mud near the bridge and the old mother mud gopher emerged. She flipped the mud off her ears and looked inquiringly toward Myrna. The girl nodded vigorously, moaned and crooned quickly in the language of the gophers, then gesture elaborately toward the *Pinnafore*.

The old mud gopher looked at her solemnly a moment, then she puffed out her cheeks, pointed her nose directly upward and emitted a long, high-pitched, penetrating cry. As soon as she had finished she lowered

her nose; the first of the gophers in the watching semicircle leaned its head back and wailed out on a different note; the next in line followed and the performance was carried on till they had all contributed their part.

Barnes walked out along the bridge. Myrna felt it dip as he approached. She twisted around and looked up pushing her dark hair from her face with a quick, distracted gesture.

"That was a fine yodeling performance," Barnes approved; "but what's it all about?"

"They're calling the tribes together," Myrna explained briefly.

"Why? What's the idea?"

"Don't ask me yet. Leave me alone. Go away," Myrna instructed absently and turned her attention to the gophers.

"Well, all right, if you feel that way about it," Barnes agreed in a puzzled voice. "I guess you know what you're doing." He retreated to the ship.

Bronson shrugged his ignorance in reply to Barnes' inquiring look.

IN RESPONSE to the cries of the leaders a general movement set in among the hordes of gophers rummaging and digging in the untrampled moss to the south. The cries were taken up and repeated into the distance. In a few minutes several thousand gophers were around the ship and more coming in steadily. Barnes stood with Bronson and the men who had been working on the bridge and watched in silence. The babble of gopher talk began to rise and swell in volume, but it wasn't the increasing crowd that held the attention of the men—it was the action of the leaders.

Under the instruction of the old matron and Myrna they placed

themselves at intervals along the side of the *Pinnafore*. Their respective tribes began to form behind them. Each of the leaders carried a reed section from the broken bridge. Myrna stood up and wailed an arresting, high-pitched command. There was a shuffle of movement among the gophers as they crowded forward to watch their leaders. At Myrna's command the chiefs of the tribes crouched even lower than their natural stance. They shuffled and wiggled a little, then with a twist and a kick of their powerful hind feet they disappeared abruptly below the surface of the mud. The reed sections they carried disappeared after them.

The assembled gophers were getting more excited, leaping up and down and climbing over one another in their efforts to see what their leaders were doing. The excitement mounted for a minute or more, then it broke bounds altogether in a deafening babble of shrill yells and yaps as the leaders emerged one by one from the mud. They crawled out onto the surface of the mud that quaked and heaved under the motion of their followers. As soon as they were clear, their powerful voices were added authoritatively to the din. In a few moments the gophers were disappearing beneath the mud by dozens and each carried a section of the wrecked bridge. Soon they were going down by hundreds, and the mud was churned to a black emulsion by their frantic efforts to get below the surface. The others were scattering, looking for pieces of bridge.

Myrna returned to the *Pinnafore*, her hair was all over the place and her face was streaked with mud. She shoved her hair back.

"Well, do you get it?" she asked.

"I think I do, but you tell it."

"The idea is that if these gophers keep at it long enough they might drag sufficient buoyant material under the ship to give enough solid to lift."

"Yeah, I kinda hoped that's what you were getting at."

Bronson shook his head. "This is sure the screwiest salvage operation I ever saw. Do you think it would help if we cut some more reeds for them?"

"That's an idea," Barnes approved. "It'd speed things up. We've got three hours," he told Myrna. "Come on." He hiked for the control cabin. He contacted Jurd and ordered the rest of the crew of the *14* to start building another reed bridge.

"Do you think it's going to work?" Myrna asked anxiously.

Barnes grinned. "Work? Say, the way those crazy mud hoppers are going below there now, they'll fill the whole lake before they're through. Can you keep them at it for long?"

"Oh, yes. They'll do anything for us now," Myrna assured him. "I think the problem is going to be stopping them."

Ten minute later a call came through from Stevens.

"We started trying to build a bridge, sir," he reported, "but there's a couple of million of these crazy jack rabbit things swiping the reed trunks as fast as we lay them down. They're hiking out your way with them. Shall we scare them off or something?"

"Gosh, no. Don't do anything like that," Barnes ordered hastily. "Keep them supplied with all the reeds they can take away. Do some bridge building if you can, but don't slow those fellows down."

"Yes, sir, if you say so, sir," Stevens acknowledged doubtfully and switched off.

AN HOUR went by and the intensity of the activity around the *Pinnafore* was still increasing. More gophers were arriving, gangs of a dozen or more were working together, taking twenty and thirty-foot reed trunks right under the ship. They were all in on it. The tiniest infants plunged manfully into the mud, small clumps of moss clutched in their forepaws.

Half an hour later Bronson sighted the bridge builders making progress from the shore. The gophers were getting the idea and waiting till Stevens and his crew dumped the reed trunks off the end of the bridge. The shorter haul left more of them free to dive and the work accelerated still more.

At the end of two hours Myrna rushed excitedly into the control cabin.

"It's working. We're lifting. The ship's coming up! It's floating! It . . . it— We're— Come and look!" She practically dragged Barnes out of the cabin after her. Bronson followed and they headed for the stern cargo port.

"Look! Look there!" Myrna instructed, shouting to make herself heard above the babbling din of the laboring gophers. Half an inch of the mud-stained ship side showed above the level of the mud. As they looked, a slight tremor shook the ship; there was a scarcely perceptible lurch and the band of mud stain widened to two inches.

"There! Did you feel that?" Myrna demanded.

"I couldn't very well help it. Look there," Barnes pointed to the end of a reed trunk that was beginning to rise above the surface. "It's building up."

Myrna's eyes were shining. "We're going to make it," she breathed excitedly. "And I thought we were all

washed up. Could we try to lift a little now?" she inquired tentatively.

"We've got an hour yet," Barnes told her. "We might as well use it all and make sure."

Fifteen minutes later Stevens and his crew brought the reed brige into contact with the *Pinnafore* again. As soon as it was connected up Bronson went back to the *14* to prepare for take-off. Atkins got the derrick repulsors busy on their hauling job again, the huge loads of reed trunks he delivered disappeared into the mud almost as soon as they were dropped. Barnes directed and coordinated activities from the control cabin of the *Pinnafore* and started getting a skeleton crew on board.

"Do you think we could try now?" Myrna asked for the fiftieth time.

"We could, but we don't need to yet," Barnes told her and cut in communications. "How is that Hertz salvage ship doing?" he asked.

"It's doing fine," Jurd replied. "Should be here in about a quarter of an hour. It's been traveling fast."

"Fifteen minutes, huh? O. K." Barnes switched off. "How long is it going to take you to call off those gophers?" he asked Myrna.

She shrugged. "I don't know. Maybe I'd better start now," she suggested hopefully. The ship lurched under them and lifted again.

"I guess you'd better," Barnes agreed. Myrna turned and vanished in one motion.

A few minutes later Barnes heard a high-pitched, babbling howl cutting through the jabbering racket that swelled up from the horde of laboring gophers. It was repeated again and again, more and more voices joining in. Gradually the confusion of voices began to quiet down, soon only the yaps and wailing howls of the tribal leaders could be heard. Through the side observation port

Barnes could see the gopher horde streaming away and taking up position a hundred yards or so from the stranded ship. Myrna returned to the cabin.

"All clear?" Barnes asked.

Myrna nodded excitedly. "Yes, they're all getting off to the side. They're keeping away from the bow and stern. Can we try to take off now?"

The communications speaker beeped before Barnes could answer.

"Ship entering the valley from the south," Jurd's voice told them tensely.

"There it is!" Myrna pointed excitedly through the port. "See? Just coming out of the mist."

Barnes looked and saw a ship four miles distant, trailing a cloud of mist and sweeping down the valley. He recognized it as one of the Hertz ships, not quite as big as the *14*.

"Well, don't just stand there. Do something," Myrna urged.

Barnes turned back to the communication system. He snapped the switch to general call.

"Stand by to take off," he ordered. An acknowledgment came through from the *14* almost immediately. The stations on board the *Pinnafore* reported in rapid succession.

MYRNA watched tensely, waiting for some reaction as Commander Barnes moved the repulsor controls. He checked the dials through the first stage, then moved directly to the third. There was no suggestion of the sluggish lag that had followed their first attempt at a take-off. The ship seemed to gather itself with a tremendous heaving surge of power, the floor rammed upward with commanding suddenness against their feet. Myrna staggered and sat down ludicrously on the floor. Barnes was

prepared for the shock and stayed erect at the controls.

Myrna struggled to her feet and lurched to the side port. She whirled toward Barnes her face exultant.

"We . . . we're off! We're up! We made it!" she yelled in jubilant unbelief.

"Yeah, I kinda noticed it," Barnes agreed.

The ship surged powerfully to the top of its repulsor extension. Barnes took no chance on a gentle take-away. He fired the drive and slapped the throttle wide open. The ship lurched forward as though it had been kicked, and immediately plunged downward as the repulsor fields slid off their support. Myrna staggered and sat down on the floor again. By the time she struggled to her feet the *Pinnafore* had dived into flying speed and started answering the atmospheric controls.

Myrna got to the control panel and stood beside Barnes watching as he nursed the liner out of its dive and pulled into a slow climb toward the north end of the valley. He used the full length of the valley and swung about easily. This ship had been subjected to enough unavoidable strains without adding anything violent that wasn't necessary.

They headed south down the valley. The Hertz salvage ship was below them, flying north.

"Good golly, he's going to land!" Barnes realized suddenly. He spun the transmitter dial to emergency call. "Calling Hertz salvage ship! Don't land! It's soft bottom!"

The commander of the salvage ship must have realized his position the moment Barnes' call came in. From the *Pinnafore* they saw the drive plume to life; the ship lunged forward and passed under them. Myrna stepped to the observation wing and looked back. She was just

in time to see the salvage ship tear into the valley bottom and plow to a stop.

"It's down," she announced. "Do we have to help them?" she asked doubtfully.

"We can't. We haven't got enough fuel," Barnes told her, and went on to explain the situation to the commander of the stranded salvage ship. "Just stay where you are and don't get your feet muddy," he advised. "We'll send something north with buoys to pull you out when we get back."

The Hertz commander's reply started coming through. Barnes snapped the receiver off hurriedly and looked quickly at Myrna.

The girl nodded. "Yes, he did sound disturbed about something," she agreed.

"What's the *14* doing?"

"It's lifting," Myrna reported, exultant triumph in her voice. "Now it's swinging out into the valley.

There, it's all clear; it's climbing after us." She came back to the control panel as Barnes lifted the nose of the ship into a steeper climbing angle and advanced the throttle a little.

"This sort of complicates things," she said slowly.

"How so?"

"Well, one ship is a ship, but two make a fleet. Now I've got to find a fleet commander somewhere."

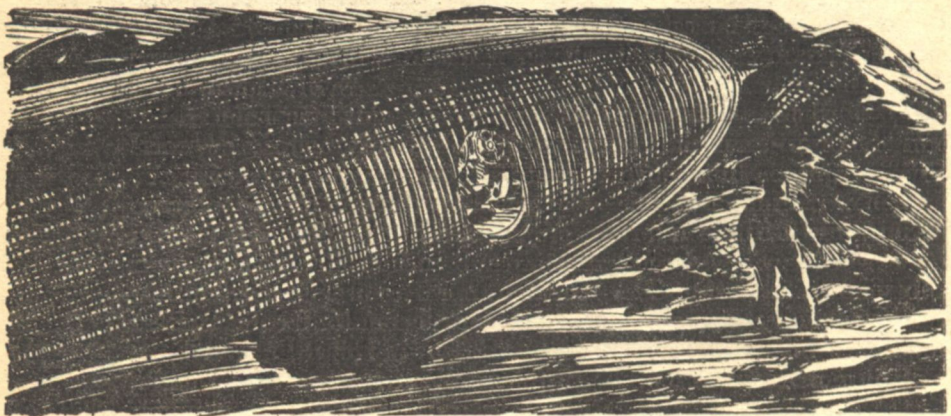
"Uh-huh."

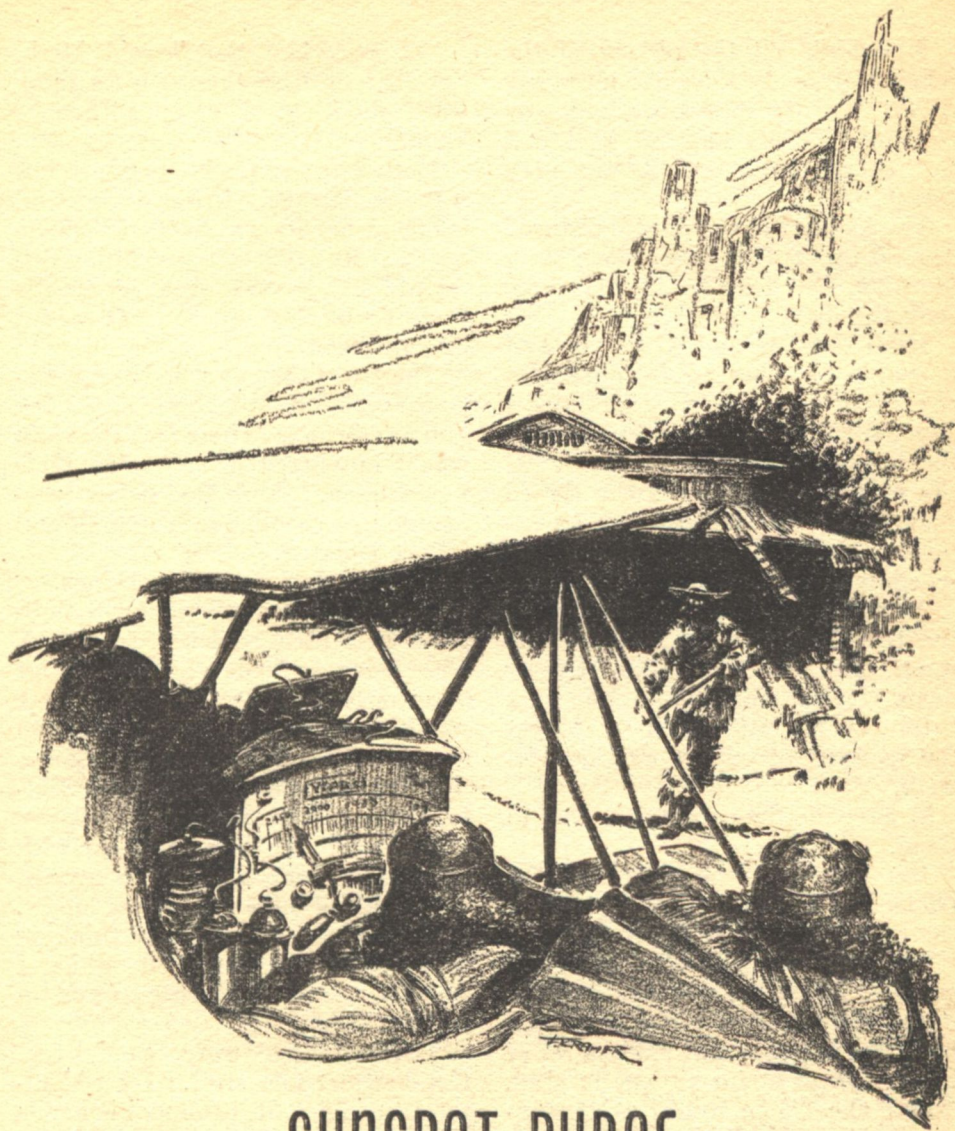
"Jon Barnes, look at me!"

He turned and looked into the perfect oval of her slightly mud-stained face, framed in the dark glory of her hair. Then he found her eyes. Her lips parted slightly and abruptly she had her commander. He practically surrounded her.

The *Pinnafore* thundered on with no one at the controls, but it didn't matter. The ship was in the clear and climbing, heading south over the top for Venus City.

THE END.





SUNSPOT PURGE

By Clifford D. Simak

They had the greatest newspaper story in history—they'd gotten it with a time-machine!—but the story included the fact they'd never use it.

Illustrated by F. Kramer

I WAS sitting around, waiting for the boy to bring up the first batch of papers from the pressroom. I had my feet up on the desk, my hat pulled down over my eyes, feeling pretty sick.

I couldn't get the picture of the fellow hitting the sidewalk out of my mind. Twenty stories is a long way to jump. When he'd hit he'd just sort of spattered and it was very messy.

The fool had cavorted and pranced around up on that ledge since early morning, four long hours, before he took the dive.

Herb Harding and Al Jarvey and a couple of other *Globe* photographers had gone out with me, and I listened to them figure out the way they'd co-operate on the shots. If the bird jumped, they knew they'd each have just time enough to expose one plate. So they got their schedules worked out beforehand.

Al would take the first shot with the telescopic lens as he made the jump. Joe would catch him halfway down, Harry would snap him just before he hit, and Herb would get the moment of impact on the sidewalk.

It gave me the creeps, listening to them.

But anyhow, it worked and the *Globe* had a swell sequence panel of the jump to go with my story.

We knew the *Standard*, even if it got that sidewalk shot, wouldn't use it, for the *Standard* claimed to be a family newspaper and made a lot of being a sheet fit for anyone to read.

But the *Globe* would print anything—and did. We gave it to 'em red-hot and without any fancy dressing.

"The guy was nuts," said Herb, who had come over and sat down beside me.

"The whole damn world is nuts," I told him. "This is the sixth bird that's hopped off a high building in the last month. I wish they'd put me down at the obit desk, or over on the markets, or something. I'm all fed up on gore."

"It goes like that," said Herb. "For a long time there ain't a thing worth shooting. Then all hell breaks loose."

Herb was right. News runs that way—in streaks. Crime waves and traffic-accident waves and suicide waves. But this was something different. It wasn't just screwballs jumping off high places. It was a lot of other things.

There was the guy who had massacred his family and then turned the gun on himself. There was the chap who'd butchered his bride on their honeymoon. And the fellow who had poured gasoline over himself and struck a match.

All such damn senseless things.

No newsman in his right mind objects to a little violence, for that's what news is made of. But things were getting pretty thick; just a bit revolting and horrifying. Enough to sicken even a hard-working legman who isn't supposed to have any feelings over things like that.

Just then the boy came up with the papers, and, if I say so myself, that story of mine read like a honey. It should have. I had been thinking it up and composing it while I watched the bird teetering around up on that ledge.

The pictures were good, too. Great street-sale stuff. I could almost see old J. R. rubbing his hands together and licking his lips and patting himself on the back for the kind of a sheet we had.

BILLY LARSON, the science editor, strolled over to my desk and draped himself over it. Billy was a funny guy. He wore big, horn-rimmed spectacles, and he wiggled his ears when he got excited, but he knew a lot of science. He could take a dry-as-dust scientific paper and pep it up until it made good reading.

"I got an idea," he announced.

"So have I," I answered. "I'm going down to the Dutchman's and take me on a beer. Maybe two or three."

"I hope," piped Herb, "that it ain't something else about old Doc Ackerman and his time machine."

"Nope," said Billy, "it's something else. Doc's time machine isn't so hot any more. People got tired of reading about it. I guess the old boy has plenty on the ball, but what of it? Who will ever use the thing? Everyone is scared of it."

"What's it this time?" I asked.

"Sunspots," he said.

I tried to brush him off, because I wanted that beer so bad I could almost taste it, but Billy had an idea, and he wasn't going to let me get away before he told me all about it.

"It's pretty well recognized," he told me, "that sunspots do affect human lives. Lots of sunspots and we have good times. Stocks and bonds are up, prices are high. Trade is good. But likewise, we have an increased nervous tension. We have violence. People get excited."

"Hell starts to pop," said Herb.

"That's exactly it," agreed Billy. "Tchijevsky, the Russian scientist, pointed it out thirty years ago. I believe he's the one that noted increased activity on battle fronts during the first World War occurring simultaneously with the appearance of large spots on the Sun. Back in 1937, the sit-down strikes were ushered in by one of the most rapid rises in the sunspot curve in twenty years."

I couldn't get excited. But Billy was all worked up about it. That's the way he is—enthusiastic about his work.

"People have their ups and downs," he said, a fanatic light creeping into his eyes, the way it does

when he's on the trail of some idea to make *Globe* readers gasp.

"Not only people, but peoples—nations, cultures, civilizations. Go back through history and you can point out a parallelism in the cycles of sunspots and significant events. Take 1937, for example, the year they had the sit-down strikes. In July of that year the sunspot cycle hits its maximum with a Wolfer index of 137.

"Scientists are pretty sure periods of excitement are explained by acute changes in the nervous and psychic characters of humanity which take place at sunspot maxima, but they aren't sure of the reasons for those changes."

"Ultraviolet light," I yawned, remembering something I had read in a magazine about it.

Billy wiggled his ears and went on: "Most likely ultraviolet has a lot to do with it. The spots themselves aren't strong emission centers for ultraviolet. But it may be the very changes in the Sun's atmosphere which produce the spots also result in the production of more ultraviolet.

"Most of the ultraviolet reaching Earth's atmosphere is used up converting oxygen into ozone, but changes of as much as twenty percent in its intensity are possible at the surface.

"And ultraviolet produces definite reaction in human glands, largely in the endocrine glands."

"I don't believe a damn word of it," Herb declared flatly, but there was no stopping Billy.

He clinched his argument: "Let's say, then, that changes in sunshine, such as occur during sunspot period, affect the physiological character and mental outlook of all the people on Earth. In other words, human behavior corresponds to sunspot cycles.

"Compare Dow Jones averages

with sunspots and you will find they show a marked sympathy with the cycles—the market rising with sunspot activity. Sunspots were riding high in 1928 and 1929. In the autumn of 1929 there was an abrupt break in sunspot activity and the market crashed. It hit bedrock in 1932 and 1933, and so did the sunspots. Wall Street follows the sunspot cycle.”

“Keep those old sunspots rolling,” I jeered at him, “and we’ll have everlasting prosperity. We’ll simply wallow in wealth.”

“Sure,” said Herb, “and the damn fools will keep jumping off the buildings.”

“But what would happen if we reversed things—made a law against sunspots?” I asked.

“Why, then,” said Billy, solemn as an owl, “we’d have terrible depressions.”

I got up and walked away from him. I had got to thinking about what I had seen on the sidewalk after the fellow jumped, and I needed that beer.

Jake, one of the copy boys, yelled at me just as I was going out the door.

“J. R. wants to see you, Mike.”

So I turned around and walked toward the door behind which J. R. sat rubbing his hands and figuring out some new stunts to shock the public into buying the *Globe*.

“MIKE,” said J. R. when I stepped into his office, “I want to congratulate you on the splendid job you did this morning. Mighty fine story, my boy, mighty fine.”

“Thanks, J. R.,” I said, knowing the old rascal didn’t mean a word of it.

Then J. R. got down to business.

“Mike,” he said, “I suppose you’ve been reading this stuff about Dr.

Ackerman’s time machine.”

“Yeah,” I told him, “but if you think you’re going to send me out to interview that old publicity grabber, you’re all wrong. I saw a guy spatter himself all over Fifth Street this morning, and I been listening to Billy Larson telling about sunspots, and I can’t stand much more. Not in one day, anyhow.”

Then J. R. dropped the bombshell on me.

“The *Globe*,” he announced, “has bought a time machine.”

That took me clear off my feet.

The *Globe*, in my time, had done a lot of wacky things, but this was the worst.

“What for?” I asked weakly, and J. R. looked shocked; but he recovered in a minute and leaned across the desk.

“Just consider, Mike. Think of the opportunities a time machine offers a newspaper. The other papers can tell them what has happened and what is happening, but, by Godfrey, they’ll have to read the *Globe* to know what is going to happen.”

“I have a slogan for you,” I said. “‘Read the News Before It Happens.’”

He didn’t know if I was joking or was serious and waited for a minute before going on.

“A war breaks out,” he said. “The other papers can tell what is happening at the moment. We can do better than that. We can tell them what will happen. Who will win and lose. What battles will be fought. Where they will be fought. How long the war will last—”

“But, J. R.,” I yelled at him, “you can’t do that! Don’t you see what a hell of a mess you’ll make of things. If one side knew it was going to lose—”

“It doesn’t apply merely to wars,” said J. R. “There’s sports. Foot-

ball games. Everybody is nuts right now to know if Minnesota is going to lick Wisconsin. We jump into our time machine, travel ahead to next Saturday. Day before the game we print the story, with pictures and everything."

He rubbed his hands and purred. "I'll have old Johnson down at the *Standard* eating out of my hand," he gloated. "I'll make him wish he never saw a newspaper. I'll take the wind out of his sails. I'll send my reporters out a day ahead—"

"You'll have every bookie on your neck," I shouted. "Don't you know there's millions of dollars bet every Saturday on football games? Don't you see what you'd do? You'd put every jackpot, every betting window out of business. Tracks would close down. Nobody would spend a dime to see a game they could read about ahead of time. You'd put organized baseball and college football, boxing, everything else out of business. What would be the use of staging a prize fight if the public knew in advance who was going to win?"

But J. R. just chortled gleefully and rubbed his hands.

"We'll publish stock-market quotations for the coming month on the first of every month," he planned. "Those papers will sell for a hundred bucks apiece."

Seeing him sitting there gave me a sinking feeling in the pit of my stomach. For I knew that in his hands rested a terrible power, a power that he was blind to or too stubborn to respect.

The power to rob every human being on Earth of every bit of happiness. For if a man could look ahead and see some of the things that no doubt were going to happen, how could he be happy?

Power to hurl the whole world into chaos. Power to make and break

any man, or thing, or institution that stood before him.

I tried another angle.

"But how do you know the machine will work?"

"I have ample proof," said J. R. "The other papers ridiculed Dr. Ackerman, while we presented his announcement at face value. That is why he is giving us an exclusive franchise to the purchase and use of his invention. It's costing us plenty of money—a barrel of money—but we're going to make two barrels of money out of it."

I shrugged my shoulders.

"O. K.," I said. "Go ahead. I don't see why the hell you called me in."

"Because," beamed J. R., "you're going to make the first trip in the time machine!"

"What!" I yelled.

J. R. nodded. "You and a photographer. Herb Harding. I called you in first. You leave tomorrow morning. Five hundred years into the future for a starter. Get pictures. Come back and write your story. We'll spring it in the Sunday paper. Whole front-page layout. What does the city look like five hundred years from now? What changes have been made? Who's mayor? What are the women wearing in the fall of 2450?"

He grinned at me.

"And you might say, too, that the *Standard* no longer is published. Whether it's the truth or not, you know. Old Johnson will go hog wild when he reads that in your story."

I COULD have refused, of course, but if I had, he would have sent somebody else and tied the can on me. Even in 1950, despite a return of prosperity that beggared the flushest peak of 1929, good jobs in the

newspaper field were not so easy to pick up.

So I said I'd go, and half an hour later I found myself getting just a bit excited about being one of the first men to travel into time. For I wouldn't be the very first. Doc Ackerman had traveled ahead a few years in his own machine, often enough and far enough to prove the thing would work.

But the prospect of it gave me a headache when I tried to reason it out. The whole thing sounded wacky to me. Not so much the idea that one could really travel in time, for I had no doubt one could. J. R. wasn't anybody's fool. Before he sunk his money in that time machine he would have demanded ironclad, gilt-edged proof that it would operate successfully.

But the thing that bothered me was the complications that might arise. The more I thought of it, the sicker and more confused I got.

Why, with a time machine a reporter could travel ahead and report a man's death, get pictures of his funeral. Those pictures could be taken back in time and published years before his death. That man, when he read the paper, would know the exact hour that he would die, would see his own face framed within the casket.

A boy of ten might know that some day he would be elected president of the United States simply by reading the *Globe*. The present president, angling for a third term, could read his own political fate if the *Globe* chose to print it.

A man might read that the next day he would meet death in a traffic accident. And if that man knew he was going to die, he would take steps to guard against it. But could he guard against it? Could he change

his own future? Or was the future cast in a rigid mold? If the future said something was going to happen, was it absolutely necessary that it must happen?

The more I thought about it, the crazier it sounded. But somehow I couldn't help but think of it. And the more I thought about it, the worse my head hurt.

So I went down to the Dutchman's.

Louie was back of the bar, and when he handed me my first glass of beer, I said to him: "It's a hell of a world, Louie."

And Louie said to me: "It sure as hell is, Mike."

I DRANK a lot of beer, but I didn't get drunk. I stayed cold sober. And that made me sore, because I figured that by rights I should take on a load. And all the time my head swam with questions and complicated puzzles.

I would have tried something stronger than beer, but I knew if I mixed drinks I'd get sick, so finally I gave up.

Louie asked me if there was something wrong, and I said no, there wasn't, but before I left I shook hands with Louie and said good-by. If I had been drunk, Louie wouldn't have thought a thing of it, but I could see he was surprised I acted that way when he knew I was sober as the daylight:

Just as I was going out the door I met Jimmy Langer coming in. Jimmy worked for the *Standard* and was a good newspaperman, but mean and full of low-down tricks. We were friends, of course, and had worked on lots of stories together, but we always watched one another pretty close. There was never any telling what Jimmy might be up to.

"Hi, Jimmy," I said.

And Jimmy did a funny thing. He didn't say a word. He just looked right at me and laughed into my face.

It took me so by surprise I didn't do anything until he was inside the Dutchman's, and then I walked down the street. But at the corner I stopped, wondering if I hadn't better go back and punch Jimmy's nose. I hadn't liked the way he laughed at me.

THE time-machine device was installed in a plane because, Doc Ackerman told us, it wouldn't be wise to try to do much traveling at ground level. A fellow might travel forward a hundred years or so and find himself smack in the middle of a building. Or the ground might rise or sink and the time machine would be buried or left hanging in the air. The only safe way to travel in time, Doc warned us, was to do it in a plane.

The plane was squatting in a pasture a short distance from Doc's laboratories, situated at the edge of the city, and a tough-looking mug carrying a rifle was standing guard over it. That plane had been guarded night and day. It was just too valuable a thing to let anyone get near it.

Doc explained the operation of the time machine to me.

"It's simple," he said. "Simple as falling off a log."

And what he said was true. All you had to do was set the indicator forward the number of years you wished to travel. When you pressed the activator stud you went into the time spin, or whatever it was that happened to you, and you stayed in it until you reached the proper time. Then the mechanism acted automatically, your time speed was slowed down, and there you were.

You just reversed the process to go backward.

Simple. Simple, so Doc said, as falling off a log. But I knew that behind all that simplicity was some of the most wonderful science the world had ever known—science and brains and long years of grueling work and terrible disappointment.

"It will be like plunging into night," Doc told me. "You will be traveling in time as a single dimension. There will be no heat, no air, no gravitation, absolutely nothing outside your plane. But the plane is insulated to keep in the heat. In case you do get cold, just snap on those heaters. Air will be supplied, if you need it, by the oxygen tanks. But on a short trip like five hundred years you probably won't need either the heaters or the oxygen. Just a few minutes and you'll be there."

J. R. had been sore at me because I had been late. Sore, too, because Herb had one of the most beautiful hangovers I have ever laid eyes on. But he'd forgotten all about that now. He was hopping up and down in his excitement.

"Just wait," he chortled. "Just wait until Johnson sees this down at the *Standard*. He'll probably have a stroke. Serve him right, the stubborn old buzzard."

The guard, standing just outside the door of the ship, was shuffling his feet. For some reason the fellow seemed nervous.

Doc croaked at him. "What's the matter with you, Benson?"

The guy stammered and shifted his rifle from one hand to another. He tried to speak, but the words just dried up in his mouth. Then J. R. started some more of his gloating and we forgot about the guard.

Herb had his cameras stowed away and everything was ready. J. R.

stuck out his fist and shook hands with me and Herb, and the old ras-cal was pretty close to tears.

Doc and J. R. got out of the ship, and I followed them to the door. Before I closed and sealed it I took one last look at the city skyline. There it shimmered, in all its glory, through the blue haze of an autumn day. Familiar towers, and to the north the smudge of smoke that hung over the industrial district.

I waved my hand at the towers and said to them: "So long, big boys. I'll be seeing you five hundred years from now."

THE SKYLINE looked different up there in the future. I had expected it to look different because in five hundred years some buildings would be torn down and new ones would go up. New architectural ideas, new construction principles over the course of five centuries will change any city skyline.

But it was different in another way than that.

I had expected to see a vaster and a greater and a more perfect city down below us when we rolled out of our time spin, and it was vaster and greater, but there was something wrong.

It had a dusty and neglected look.

It had grown in those five hundred years, there was no doubt of that. It had grown in all directions, and must have been at least three times as big as the city Herb and I had just left behind.

Herb leaned forward in his seat.

"Is that really the old burg down there?" he asked. "Or is it just my hangover?"

"It's the same old place," I assured him. Then I asked him. "Where did you pick up that beauty you've got?"

"I was out with some of the boys," he told me. "Al and Harry. We met up with some of the *Standard* boys and had a few drinks with them later in the evening."

There were no planes in the sky, and I had expected that in 2450 the air would fairly swarm with them. They had been getting pretty thick even back in 1950. And now I saw the streets were free of traffic, too.

We cruised around for half an hour, and during that time the truth was driven home to us. A truth that was plenty hard to take.

That city below us was a dead city! There was no sign of life. Not a single automobile on the street, not a person on the sidewalks.

Herb and I looked at one another, and disbelief must have been written in letters three feet high upon our faces.

"Herb," I said, "we gotta find out what this is all about."

Herb's Adam's apple jiggled up and down his neck.

"Hell," he said. "I was figuring on dropping into the Dutchman's and getting me a pick-up."

It took almost an hour to find anything that looked like an airport, but finally I found one that looked safe enough. It was overgrown with weeds, but the place where the concrete runways had been was still fairly smooth, although the concrete had been broken here and there, and grass and weeds were growing through the cracks.

I took her down as easy as I could, but even at that we hit a place where a slab of concrete had been heaved and just missed a crack-up.

THE OLD FELLOW with the rifle could have stepped from the pages of a history of early pioneer days except that once in a while the pioneers probably got a haircut.

He came out of the bushes about a mile from the airport, and his rifle hung cradled in his arm. There was something about him that told me he wasn't one to fool with.

"Howdy, strangers," he said in a voice that had a whiny twang.

"By Heaven," said Herb, "it's Daniel Boone himself."

"You jay birds must be a right smart step from home," said the old guy, and he didn't sound as if he'd trust us very far.

"Not so far," I said. "We used to live here a long time ago."

"Danged if I recognize you." He pushed back his old black felt hat and scratched his head. "And I thought I knew everybody that ever lived around here. You wouldn't be Jake Smith's boys, would you?"

"Doesn't look like many people are living here any more," said Herb.

"Matter of fact, there ain't," said Daniel Boone. "The old woman was just telling me the other day we'd have to move so we'd be nearer neighbors. It gets mighty lonesome for her. Nearest folks is about ten miles up thataway."

He gestured to the north, where the skyline of the city loomed like a distant mountain range, with gleaming marble ramparts and spires of mocking stone.

"Look here," I asked him. "Do you mean to say your nearest neighbor is ten miles away?"

"Sure," he told me. "The Smiths lived over a couple of miles to the west, but they moved out this spring. Went down to the south. Claimed the hunting was better there."

He shook his head sadly. "Maybe hunting is all right. I do a lot of it. But I like to do a little farming, too. And it's mighty hard to break new ground. I had a right handsome

bunch of squashes and carrots this year. 'Taters did well, too."

"But at one time a lot of people lived here," I insisted. "Thousands and thousands of people. Probably millions of them."

"I heard tell of that," agreed the old man, "but I can't rightfully say there's any truth in it. Must've been a long time ago. Somebody must have built all them buildings—although what for I just can't figure out."

THE *Globe* editorial rooms were ghostly. Dust lay everywhere, and a silence that was almost as heavy as the dust.

There had been some changes, but it was still a newspaper office. All it needed was the blur of voices, the murmur of the speeding presses to bring it to life again.

The desks still were there, and chairs ringed the copy table.

Our feet left trails across the dust that lay upon the floor and raised a cloud that set us both to sneezing.

I made a beeline for one dark corner of the room; there I knew I would find what I was looking for.

Old bound files of the paper. Their pages crackled when I opened them, and the paper was so yellowed with age that in spots it was hard to read.

I carried one of the files to a window and glanced at the date. September 14, 2143. Over three hundred years ago!

A banner screamed: "Relief Riots in Washington."

Hurriedly we leafed through the pages. And there, on the front pages of those papers that had seen the light more than three centuries before, we read the explanation for the silent city that lay beyond the shattered, grime-streaked windows.

"Stocks Crash to Lowest Point in

Ten Years!" shrieked one banner. Another said: "Congress Votes Record Relief Funds." Still another: "Taxpayers Refuse to Pay." After that they came faster and faster. "Debt Moratorium Declared"; "Bank Holiday Enforced"; "Thousands Starving in Cleveland"; "Jobless March on Washington"; "Troops Fight Starving Mobs"; "Congress Gives Up, Goes Home"; "Epidemic Sweeping East"; "President Declares National Emergency"; "British Government Abdicates"; "Howling Mob Sweeping Over France"; "U. S. Government Bankrupt."

In the market and financial pages, under smaller heads, we read footnotes to those front-page lines. Story after story of business houses closing their doors, of corporations crashing, reports on declining trade, increasing unemployment, idle factories.

Civilization, three hundred years before, had crashed to ruin under the very weight of its own superstructure. The yellowed files did not tell the entire story, but it was easy to imagine.

"The world went nuts," said Herb.

"Yeah," I said. "Like that guy who took the dive."

I could see it all as plain as day. Declining business, increasing unemployment, heavier taxation to help the unemployed and buy back prosperity, property owners unable to pay those taxes. A vicious circle.

Herb was rummaging around back in the dimness by the filing cabinet. Presently he came out into the light again, all covered with dust.

"There're only twenty or thirty years of files," he said, "and we got the newest one. But I found something else. Back behind the cabinet. Guess it must have fallen back there and nobody ever bothered to clean it out."

He handed it to me—an old and crumpled paper, so brittle with age I was afraid it might crumble to dust in my very hands.

"There was quite a bit of rubble back of the cabinet," said Herb. "Some other papers. Old, too, but this one was the oldest."

I looked at the date. April 16, 1985.

That yellowed paper was almost five hundred years old! It had come off the press less than thirty-five years after Herb and I had taken off with the time machine!

Lying behind the filing cabinet all those years. The cabinet was large and heavy to move, and janitors in newspaper offices aren't noted for outstanding tidiness.

But there was something bothering me. A little whisper way back in my head, somewhere down at the base of my brain, that kept telling me there was something I should remember.

I TOSSED the old paper on a desk and walked to a window. Most of the glass was broken out, and what wasn't broken out was coated so thick with grime you couldn't see through it. I looked out through the place where there wasn't any glass.

There the city lay—almost as I remembered it. There was Jackson's tower, the tallest in the city back in 1950, but now dwarfed by three or four others. The spire of the old cathedral was gone, and I missed that, for it had been a pretty thing. I used to sit and watch it from this very window through the mist of early-spring rain or through the ghostly white of the winter's first snowfall. I missed the spire, but Jackson's tower was there, and so were a lot of other buildings I could place.

And every one of them looked lonely. Lonely and not quite understanding—like a dog that's been kicked out of a chair he thinks of as his own. Their windows gaping like dead eyes. No cheerful glow of light within them. Their colors dulled by the wash of seasons that had rolled over them.

This was worse, I told myself, than if we'd found the place all smashed to hell by bombs. Because, brutal as it is, one can understand a bombed city. And one can't understand, or feel comfortable in a city that's just been left behind to die.

And the people!

Thinking about them gave me the jitters. Were all the people like old Daniel Boone? We had seen how he and his family lived, and it wasn't pretty. People who had backed down the scale of progress. People who had forgotten the printed word, had twisted the old truths and the old history into screwy legends.

It was easy enough to understand how it had happened. Pull the economic props from under a civilization and there's hell to pay. First you have mad savagery and even madder destruction as class hatred flames unchecked. And when that hatred dies down after an orgy of destruction there is bewilderment, and then some more savagery and hatred born of bewilderment.

But, sink as low as he may, man always will climb again. It's the nature of the beast. He's an ornery cuss.

But man, apparently, hadn't climbed again. Civilization, as Herb and I knew it, had crashed all of three hundred years before—and man still was content to live in the shadow of his former greatness, not questioning the mute evidences of his mighty past, uninspired by the soar-

ing blocks of stone that reared mountainous above him.

There was something wrong. Something devilish wrong.

Dust rose and tickled my nose, and suddenly I realized my throat was hot and dry. I wanted a beer. If I could only step down the street to the Dutchman's—

Then it smacked me straight between the eyes, the thing that had been whispering around in the back of my head all day.

I remembered Billy Larson's face and the way his ears wiggled when he got excited and how hopped up he had been about a sunspot story.

"By Heaven, Herb, I got it," I yelled, turning from the window.

Herb's mouth sagged, and I knew he thought that I was nuts.

"I know what happened now," I said. "We have to get a telescope."

"Look here, Mike," said Herb, "if you feel—"

But I didn't let him finish.

"It's the sunspots," I yelled at him.

"Sunspots?" he squeaked.

"Sure," I said. "There aren't any."

MY HUNCH had been right.

There weren't any sunspots. No black dots on that great ball of flame.

It had taken two days before we found a pair of powerful field glasses in the rubbish of what once had been a jewelry store. Most of the stores and shops were wiped clean. Raided time after time in the violence which must have followed the breakdown of government, they later would have been looted systematically.

"Herb," I said, "there must have been something in what Billy said. Lots of sunspots and we have good times. No sunspots and we have bad times."

"Yeah," said Herb, "Billy was plenty smart. He knew his science, all right."

I could almost see Billy, his ears wiggling, his eyes glowing, as he talked to me that morning.

Wall Street followed the sunspot cycle, he had said. Business boomed when sunspots were riding high, went to pot when they blinked out.

I remembered asking him what would happen if someone passed a law against sunspots. And now it seemed that someone had!

It was hard to believe, but the evidence was there. The story lay in those musty files up in the *Globe* office. Stories that told of the world going mad when business scraped rock bottom. Of governments smashing, of starving hordes sweeping nation after nation.

I put my head down between my hands and groaned. I wanted a glass of beer. The kind Louie used to push across the bar, cool and with a lot of foam on top. And now there wasn't any beer. There hadn't been for centuries. All because of sunspots!

Ultraviolet light. Endocrine glands and human behavior. Words that scientists rolled around in their mouths and nobody paid much attention to. But they were the things that had played the devil with the human race.

Herb chuckled behind me. I swung around on him, my nerves on edge.

"What's the matter with you?" I demanded.

"Boy," said Herb, "this Wash Tubbs can get himself into some of the damndest scrapes!"

"What you got there?" I asked, seeing he was reading a paper.

"Oh, this," he said. "This is that old paper we found up at the office.

The one published in '85. I'm going to take it back and give it to J. R. But right now I'm reading the funnies—"

I grunted and hunkered down, turning my mind back to the sunspots. It sounded wacky, all right, but that was the only explanation.

It didn't seem right that a body of matter ninety-three million miles away could rule the lives of mankind—but, after all, all life depended on the Sun. Whiff out the Sun and there wouldn't be any life. Those old savages who had worshiped the Sun had the right idea.

Say, then, that sunspots had gone out of style. What would happen? Exactly what those files back at the *Globe* office had shown. Depression, ever deepening. Business failures, more and more men out of work, taxes piling higher and higher as a panicky government fought to hold off the day of reckoning.

I HEARD Herb making some strangling sounds and swung around again. I was getting annoyed with Herb.

But the look on Herb's face halted the words that were bubbling on my lips. His face was stark. It was white as a sheet and his eyes were frozen wide.

He shoved the paper at me, babbling, a shaking finger pointing at a small item.

I grabbed the sheet and squinted to make out the faded type. Then I read, slowly, but with growing horror:

LANGER DIES

"James Langer, convicted in 1951 of tampering with the time machine in which Mike Hamilton and Herb Harding, *Globe* newsmen, set out on a flight into the future the preceding year, died in Rocky Point prison today at the age of sixty-five. "Langer, at his trial, confessed he had

bribed the guard placed in charge of the machine, to allow him to enter the plane in which it was installed. There, he testified, he removed that portion of the mechanism which made it possible for the machine to move backward in time.

"Langer, at that time, was an employee of the *Standard*, which went out of business a few years later.

"National indignation aroused by the incident resulted in the passage by Congress of a law prohibiting further building or experimentation with time machines. Heart-broken, Dr. Ambrose Ackerman, inventor of the machine, died two weeks after the trial."

I sat numb for a few minutes, my hand tightening in a terrible grip upon the paper, grinding its yellowed pages into flaking shreds.

Then I looked at Herb, and as I looked into his fear-stricken face I remembered something.

"So," I said, and I was so mad that I almost choked.

"So, you just had a few drinks with the boys that night before we left. You just met up with some *Standard* boys and had a few."

I remembered the way Jimmy Langer had laughed in my face as I was leaving the Dutchman's. I remembered how nervous the guard had been that morning.

"You didn't spill your guts, did you?" I rasped.

"Look, Mike—" said Herb, getting up off the ground.

"You got drunk, damn you," I yelled at him, "and your brains ran right out of your mouth. You told that *Standard* crowd everything you knew. And Old Man Johnson sent Langer out to do the dirty work."

I was mad, mad clear down to the soles of my boots.

"Damn you, Mike—" said Herb, and right then I let him have it. I gave him a poke that shook him clear down to the ground, but he came right back at me. Maybe he was mad, too.

He clipped me alongside the jaw and I plastered him over the eye, and after that we went at it hammer and tongs.

Herb wasn't any slouch with his dukes, and he kept me pretty busy. I gave him everything I had, but he always came back for more, and he pasted me a few that set my head to ringing.

But I didn't mind—all I wanted was to give Herb a licking he'd remember right down to the day he breathed his last.

When we quit it was just because neither one of us could fight another lick. We lay there on the ground, gasping and glaring at one another. One of Herb's eyes were closed, and I knew I had lost a couple of teeth and my face felt like it had been run through a meat grinder.

Then Herb grinned at me.

"If I could have stayed on my feet a bit longer," he gasped, "I'd have murdered you."

And I grinned back at him.

PROBABLY we should have stayed back in 2450. We had a chance back there. Old Daniel Boone didn't know too much, but at least he was civilized in a good many ways. And no doubt there still were books, and we might have been able to find other useful things.

We might have made a stab at rebuilding civilization, although the cards would have been stacked against us. For there's something funny about that sunspot business. When the sunspots stopped rearing around out on the Sun, something seemed to have run out of men—the old double-fisted, hell-for-leather spirit that had taken them up through the ages.

But we figured that men would make a come-back. We were pretty

sure that somewhere up in the future we'd find a race that had started to climb back.

So we went ahead in time. Even if we couldn't go back, we still could go ahead.

We went five hundred years and found nothing. No trace of Daniel Boone's descendants. Maybe they'd given up raising squashes and had moved out where the hunting was better. The city still stood, although some of the stones had crumbled and some of the buildings were falling to pieces.

We traveled another five hundred years, and this time a horde of howling savages, men little more advanced than the tribes which roamed over Europe in the old Stone Age, charged out of the ruins at us, screaming and waving clubs and spears.

We just beat them to the plane.

In two thousand years the tribe had disappeared, and in its place we saw skulking figures that slunk among the mounds that once had been a city. Things that looked like men.

And after that we found nothing at all. Nothing, that is, except a skeleton that looked like it might once have been a human being.

Here at last we stop. There's no use of going farther, and the gas in the tank of our plane is running low.

The city is a heap of earthy mounds, bearing stunted trees. Queer animals shuffle and slink over and among the mounds. Herb says they are mutations—he read about mutations somewhere in a book.

To the west stretch great veldts of waving grass, and across the river the hills are forested with mighty trees.

But Man is gone. He rose, and for a little while he walked the Earth. But now he's swept away.

Back in 1950, Man thought he was the whole works. But he wasn't so hot, after all. The sunspots took him to the cleaners. Maybe it was the sunspots in the first place that enabled him to rise up on his hind legs and rule the roost. Billy said that sunspots could do some funny things.

But that doesn't matter now. Man is just another has-been.

There's not much left for us to do. Just to sit and think about J. R. rubbing his hands together. And Billy Larson wiggling his ears. And the way Jimmy Langer laughed that night outside the Dutchman's place.

Right now I'd sell my soul to walk into the Dutchman's place and say to Louie: "It's a hell of a world, Louie."

And hear Louie answer back: "It sure as hell is, Mike."

THE END.



IN TIMES TO COME



COMING up next month is a yarn by P. Schuyler Miller, entitled "Old Man Mulligan." Rogers did a cover on that yarn, incidentally, and a good one. But Miller has something a little different in the way of a yarn—a most interesting character. Old Man Mulligan wasn't too bright, in many ways, but he'd had worlds of experience—knew lots of rather old-fashioned tricks that will work today, or tomorrow on Venus for that matter. He makes for a good yarn—and Schuyler Miller's gotten the most out of it.

Another yarn coming up is "Spheres," by D. M. Edwards—a novelette by a first-timer that will, I think, take a high place in the Analytical Lab. Edwards has some nice ideas—and he, too, has a lovely, wacky character. I have a strong suspicion D. M. Edwards will be appearing at intervals henceforth. One of this year's finds.

And, in next month's issue, A. E. van Vogt will, I think, prove to you that what I said about "Slan" was true; it gets stronger in every installment, and you don't know what it's all about till the last paragraph!

THE EDITOR.

ANALYTICAL LABORATORY

I TRIED a new method of scoring in working up the votes this month; one of the things that has always bothered me about this analysis of reader opinion is the fact that many people report on serials only when they're completed. Hence, if those people do report on the novelettes, the complete stories score more points than the serials—and might not actually represent a true cross-section of feeling.

This time, on the old method, "Blowups Happen" had a clear lead; on the new method it's exactly tied with "Slan." And evidently they are both being rated as among the year's best. The score as worked out on the new system:

1. Tied between:
"Blowups Happen"
"Slan"
2. "Homo Sol"
3. "Quietus"
4. "The Killkenny Cats"

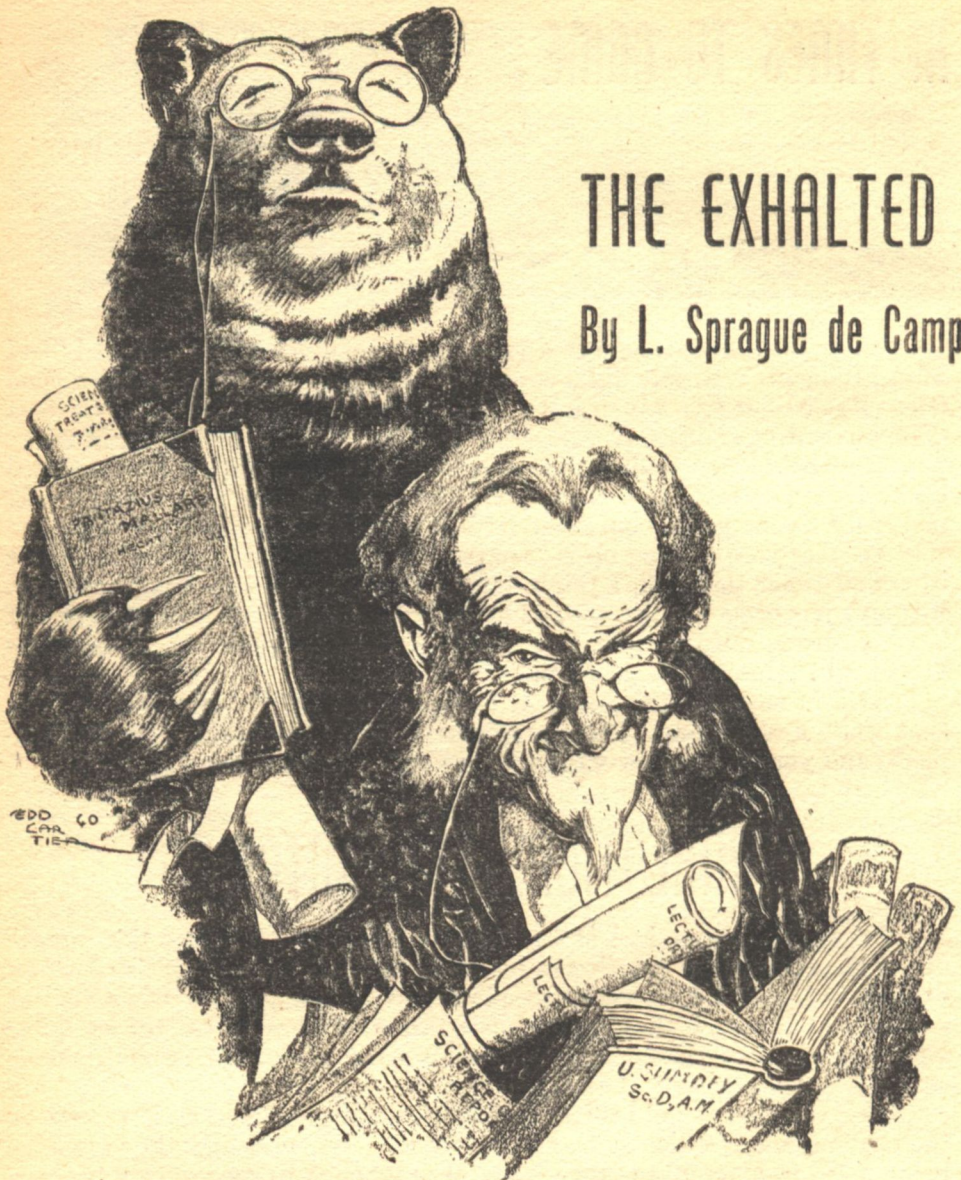
Robert A. Heinlein
A. E. van Vogt
Isaac Asimov
Ross Rocklynne
Kurt von Rachen

I believe the new method—a bit too complex to explain in the space available—is genuinely fair.

THE EDITOR.

THE EXHALTED

By L. Sprague de Camp



Meet Johnny Black, the educated bear, once more—and a character unique in science-fiction: a mad genius! And we mean mad—completely bughouse.

Illustrated by Cartier

The storklike man with the gray goatee shuffled the twelve black billets about on the table top. "Try it again," he said.

The undergraduate sighed. "O. K., Professor Methuen." He looked apprehensively at Johnny Black, sitting across the table with one claw

on the button of the stop clock. Johnny returned the look impassively through the spectacles perched on his yellowish muzzle.

"Go," said Ira Methuen.

Johnny depressed the button. The undergraduate started the second run of his wiggly-block test. The twelve billets formed a kind of three-dimensional jigsaw puzzle; when assembled they would make a cube. But the block had originally been sawn apart on wavy, irregular lines, so that the twelve billets had to be put together just so.

The undergraduate fiddled with the billets, trying this one and that one against one he held in his hand. The clock ticked round. In four minutes he had all but one in place. This one, a corner piece, simply would not fit. The undergraduate wiggled it and pushed it. He looked at it closely and tried again. But its maladjustment remained.

The undergraduate gave up. "What's the trick?" he asked.

Methuen reversed the billet end for end. It fitted.

"Oh, heck," said the undergraduate. "I could have gotten it if it hadn't been for Johnny."

Instead of being annoyed, Johnny Black twitched his mouth in a bear's equivalent of a grin. Methuen asked the student why.

"He distracts me somehow. I know he's friendly and all that, but . . . it's this way, sort of. Here I come to Yale to get to be a psychologist. I hear all about testing animals, chimps and bears and such. And when I get here I find a bear testing *me*. It's kind of upsetting."

"That's all right," said Methuen. "Just what we wanted. We're after, not your wiggly-block score by itself, but the effect of Johnny's presence on people taking the test. We're getting Johnny's distraction factor—his

ability to distract people. We're also getting the distraction factor of a lot of other things, such as various sounds and smells. I didn't tell you sooner because the knowledge might have affected your performance."

"I see. Do I still get my five bucks?"

"Of course. Good day, Kitchell. Come on, Johnny; we've just got time to make Psychobiology 100. We'll clean up the stuff later."

On the way out of Methuen's office, Johnny asked: "Hey, boss! Do you feer any effec' yet?"

"Not a bit," said Methuen. "I think my original theory was right: that the electrical resistance of the gaps between human neurons is already as low as it can be, so the Methuen injections won't have any appreciable effect on a human being. Sorry, Johnny, but I'm afraid your boss won't become any great genius as a result of trying a dose of his own medicine."

The Methuen treatment had raised Johnny's intelligence from that of a normal black bear to that of—or more exactly to the equivalent of that of—a human being. It had enabled him to carry out those spectacular coups in the Virgin Islands and the Central Park Zoo. It had also worked on a number of other animals in the said zoo, with regrettable results.

Johnny grumbled in his urso-American accent: "Stirr, I don't sink it is smart to teach a crass when you are furr of zat stuff. You never know—"

But they had arrived. The class comprised a handful of grave graduate students, on whom Johnny's distraction factor had little effect.

IRA METHUEN was not a good lecturer. He put in too many uh's and er's, and tended to mumble. Besides,

Psychobiology 100 was an elementary survey, and Johnny was pretty well up in the field himself. So he settled himself to a view of the Grove Street Cemetery across the street, and to melancholy reflections on the short life span of his species compared with that of men.

"Ouch!"

R. H. Wimpus, B. S., '68, jerked his backbone from its normally nonchalant arc into a quivering reflex curve. His eyes were wide with mute indignation.

Methuen was saying: "—whereupon it was discovered that the . . . uh . . . paralysis of the pes resulting from excision of the corresponding motor area of the cortex was much more lasting among the Simiidae than among the other catarrhine primates; that it was more lasting among these than among the platyrrhines— Mr. Wimpus?"

"Nothing," said Wimpus. "I'm sorry."

"And that the platyrrhines, in turn, suffered more than the lemuroids and tarsioids. When—"

"Unh!" Another graduate student jerked upright. While Methuen paused with his mouth open, a third man picked a small object off the floor and held it up.

"Really, gentlemen," said Methuen, "I thought you'd outgrown such amusements as shooting rubber bands at each other. As I was saying when—"

Wimpus gave another grunt and jerk. He glared about him. Methuen tried to get his lecture going again. But, as rubber bands from nowhere continued to sting the necks and ears of the listeners, the classroom organization visibly disintegrated like a lump of sugar in a cup of weak tea.

Johnny had put on his spectacles and was peering about the room.

But he was no more successful than the others in locating the source of the bombardment.

He slid off his chair and shuffled over to the light switch. The daylight through the windows left the rear end of the classroom dark. As soon as the lights went on, the source of the elastics was obvious. A couple of the graduates pounced on a small wooden box on the shelf beside the projector.

The box gave out a faint whir, and spat rubber bands through a slit, one every few seconds. They brought it up and opened it on Methuen's lecture table. Inside was a mass of machinery apparently made of the parts of a couple of alarm clocks and a lot of hand-whittled wooden cams and things.

"My, my," said Methuen. "A most ingenious contraption, isn't it?"

The machine ran down with a click. While they were still examining it, the bell rang.

Methuen looked out the window. A September rain was coming up. Ira Methuen pulled on his topcoat and his rubbers and took his umbrella from the corner. He never wore a hat. He went out and headed down Prospect Street, Johnny padding behind.

"Hi!" said a young man, a fat young man in need of a haircut. "Got any news for us, Professor Methuen?"

"I'm afraid not, Bruce," replied Methuen. "Unless you call Ford's giant mouse news."

"What? What giant mouse?"

"Dr. Ford has produced a three-hundred-pound mouse by orthogonal mutation. He had to alter its morphological characteristics—"

"Its what?"

"Its shape, to you. He had to alter it to make it possible for it to live—"

"Where? Where is it?"

"Osborn Labs. If—" But Bruce Inglehart was gone up the hill toward the science buildings. Methuen continued: "With no war on, and New Haven as dead a town as it always has been, they have to come to us for news, I suppose. Come on, Johnny. Getting garrulous in my old age."

A passing dog went crazy at the sight of Johnny, snarling and yelping. Johnny ignored it. They entered Woodbridge Hall.

Dr. Wendell Cook, president of Yale University, had Methuen sent in at once. Johnny, excluded from the sanctum, went up to the president's secretary. He stood up and put his paws on her desk. He leered—you have to see a bear leer to know how it is done—and said: "How about it, kid?"

Miss Prescott, an unmistakable Boston spinster, smiled at him. "Sut-tinly, Johnny. Just a moment." She finished typing a letter, opened a drawer, and took out a copy of Hecht's "Fantazius Mallare." This she gave Johnny. He curled up on the floor, adjusted his glasses, and read.

After a while he looked up, saying: "Miss Prescott, I am halfway srough zis, and I stirr don't see why zey cawr it obscene. I sink it is just durr. Can't you get me a *rearry* dirty book?"

"Well, really, Johnny, I don't run a pornography shop, you know. Most people find that quite strong enough."

Johnny sighed. "Peopre get excited over ze funnies' sings."

MEANWHILE, Methuen was closeted with Cook and Dalrymple, the prospective endower, in another of those interminable and indecisive conferences. R. Hanscom Dalrym-

ple looked like a statue that the sculptor had never gotten around to finishing. The only expression the steel chairman ever allowed himself was a canny, secretive smile. Cook and Methuen had a feeling he was playing them on the end of a long and well-knit fish line made of U. S. Federal Reserve notes. It was not because he wasn't willing to part with the damned endowment, but because he enjoyed the sensation of power over these oh-so-educated men. And in the actual world, one doesn't lose one's temper and tell Croesus what to do with his loot. One says: "Yes, Mr. Dalrymple. My, my, that is a brilliant suggestion, Mr. Dalrymple! Why didn't we think of it ourselves?" Cook and Methuen were both old hands at this game. Methuen, though otherwise he considered Wendell Cook a pompous ass, admired the president's endowment-snagging ability. After all, wasn't Yale University named after a retired merchant on the basis of a gift of five hundred and sixty-two pounds twelve shillings?

"Say, Dr. Cook," said Dalrymple, "why don't you come over to the Taft and have lunch on me for a change? You, too, Professor Methuen."

The academics murmured their delight and pulled on their rubbers. On the way out Dalrymple paused to scratch Johnny behind the ears. Johnny put his book away, keeping the title on the cover out of sight, and restrained himself from snapping at the steel man's hand. Dalrymple meant well enough, but Johnny did not like people to take such liberties with his person.

So three men and a bear slopped down College Street. Cook paused now and then, ignoring the sprinkle, to make studied gestures toward one or another of the units of the great

soufflé of Georgian and Collegiate Gothic architecture. He explained this and that. Dalrymple merely smiled his blank little smile.

Johnny, plodding behind, was the first to notice that passing undergraduates were pausing to stare at the president's feet. The word "feet" is meant literally. For Cook's rubbers were rapidly changing into a pair of enormous pink bare feet.

Cook himself was quite unconscious, until quite a group of undergraduates had collected. These gave forth the catarrhal snorts of men trying unsuccessfully not to laugh. By the time Cook had followed their stares and looked down, the metamorphosis was complete. That he should be startled was only natural. The feet were startling enough. His face gradually matched the feet in redness, making a cheerful note of color in the gray landscape.

R. Hanscom Dalrymple lost his reserve for once. His howls did nothing to save prexy's now-apoplectic face. Cook finally stooped and pulled off the rubbers. It transpired that the feet had been painted on the outside of the rubbers and covered over with lampblack. The rain had washed the lampblack off.

Wendell Cook resumed his walk to the Hotel Taft in gloomy silence. He held the offensive rubbers between thumb and finger as if they were something unclean and loathsome. He wondered who had done this dastardly deed. There hadn't been any undergraduates in his office for some days, but you never wanted to underestimate the ingenuity of undergraduates. He noticed that Ira Methuen was wearing rubbers of the same size and make as his own. But he put suspicion in that direction out of his mind before it had fully formed. Certainly Methuen wouldn't play practical jokes with Dalrymple

around, when he'd be the head of the new Department of Biophysics when—if—Dalrymple came through with the endowment.

The next man to suspect that the Yale campus was undergoing a severe pixillation was John Dugan, the tall thin one of the two campus cops. He was passing Christ Church—which is so veddy high-church Episcopal that they refer to Charles I of England as St. Charles the Martyr—on his way to his lair in Phelps Tower. A still small voice spoke in his ear: "Beware, John Dugan! Your sins will find you out!"

Dugan jumped and looked around. The voice repeated its message. There was nobody within fifty feet of Dugan. Moreover, he could not think of any really serious sins he had committed lately. The only people in sight were a few undergraduates and Professor Methuen's educated black bear, trailing after his boss as usual. There was nothing for John Dugan to suspect but his own sanity.

R. HANSCOM DALRYMPLE was a bit surprised at the grim earnestness of the professors in putting away their respective shares of the James Pierpont dinner. They were staying the eternal gnaw of hunger that afflicts those who depend on a college commissary for sustenance. Many of them suspected a conspiracy among college cooks to see that the razor edge wasn't taken off students' and instructors' intellects by over-feeding. They knew that conditions were much the same in most colleges.

Dalrymple sipped his coffee and looked at his notes. Presently Cook would get up and say a few pleasant nothings. Then he would announce Dalrymple's endowment, which was to be spent in building a Dalrymple Biophysical Laboratory

and setting up a new department. Everybody would applaud and agree that biophysics had floated in the void between the domains of the departments of zoölogy, psychology, and the physiological sciences long enough. Then Dalrymple would get up and clear his throat and say—though in much more dignified language: “Shucks, fellas, it really isn’t nothing.”

Dr. Wendell Cook duly got up, beamed out over the ranked shirt fronts, and said his pleasant nothings. The professors exchanged nervous looks when he showed signs of going off into his favorite oration, there-is-no-conflict-between-science-and-religion. They had heard it before.

He was well launched into Version 3A of this homily, when he began to turn blue in the face. It was not the dark purplish-gray called loosely “blue” that appears on the faces of stranglers, but a bright, cheerful cobalt. Now, such a color is all very well in a painting of a ship sailing under a clear sky, or in the uniform of a movie-theater doorman. But it is distinctly out of place in the face of a college president. Or so felt the professors. They leaned this way and that, their boiled shirts bulging, popping and gaping as they did so, and whispered.

Cook frowned and continued. He was observed to sniff the air as if he smelled something. Those at the speakers’ table detected a slight smell of acetone. But that seemed hardly an adequate explanation of the robin’s-egg hue of their prexy’s face. The color was now quite solid on the face proper. It ran up into the area where Cook’s hair would have been if he had had some. His collar showed a trace of it, too.

Cook, on his part, had no idea of why the members of his audience

were swaying in their seats like saplings in a gale and whispering. He thought it very rude of them. But his frowns had no effect. So presently he cut Version 3A short. He announced the endowment in concise, businesslike terms, and paused for the expected thunder of applause.

There was none. To be exact, there was a feeble patter that nobody in his right mind would call a thunder of anything.

COOK LOOKED at R. Hanscom Dalrymple, hoping that the steel man would not be insulted. Dalrymple’s face showed nothing. Cook assumed that this was part of his general reserve. The truth was that Dalrymple was too curious about the blue face to notice the lack of applause. When Cook introduced him to the audience, it took him some seconds to pull himself together.

He started rather lamely: “Gentlemen and members of the Yale faculty . . . uh . . . I mean, of course, you’re *all* gentlemen . . . I am reminded of a story about the poultry farmer who got married— I mean, I’m not reminded of *that* story, but the one about the divinity student who died and went to—” Here Dalrymple caught the eye of the dean of the divinity school. He tacked again: “Maybe I’d . . . uh . . . better tell the one about the Scotchman who got lost on his way home and—”

It was not a bad story, as such things go. But it got practically no laughter. Instead, the professors began swaying, like a roomful of boiled-shirted Eastern ascetics at their prayers, and whispering again.

Dalrymple could put two and two together. He leaned over and hissed into Cook’s ear: “Is there anything wrong with me?”

"Yes, your face has turned green."

"Green?"

"Bright green. Like grass. Nice young grass."

"Well, you might like to know that yours is blue."

Both men felt their faces. There was no doubt; they were masked with coatings of some sort of paint, still wet.

Dalrymple whispered: "What kind of gag is this?"

"I don't know. Better finish your speech."

Dalrymple tried. But his thoughts were scattered beyond recovery. He made a few remarks about how glad he was to be there amid the elms and ivy and traditions of old Elm, and sat down. His face looked rougher-hewn than ever. If a joke had been played on him—well, he hadn't signed any checks yet.

The lieutenant governor of the State of Connecticut was next on the list. Cook shot a question at him. He mumbled: "But if I'm going to turn a funny color when I get up—"

The question of whether his honor should speak was never satisfactorily settled. For at that moment a thing appeared on one end of the speakers' table. It was a beast the size of a St. Bernard. It looked rather the way a common bat would look if, instead of wings, it had arms with disk-shaped pads on the ends of the fingers. Its eyes were as big around as luncheon plates.

There was commotion. The speaker sitting nearest the thing fell over backward. The lieutenant governor crossed himself. An English zoölogist put on his glasses and said: "By Jove, a spectral tarsier! But a bit large, what?"

A natural-sized tarsier would fit in your hand comfortably, and is

rather cute if a bit spooky. But a tarsier the size of this one is not the kind of thing one can glance at and then go on reading the adventures of Alley Oop. It breaks one's train of thought. It disconcerts one. It may give one the screaming meemies.

This tarsier walked gravely down the twenty feet of table. The diners were too busy going away from there to observe that it upset no tumblers and kicked no ashtrays about; that it was, in fact, slightly transparent. At the other end of the table it vanished.

Johnny Black's curiosity wrestled with his better judgment. His curiosity told him that all these odd happenings had taken place in the presence of Ira Methuen. Therefore, Ira Methuen was at least a promising suspect. "So what?" said his better judgment. "He's the only man you have a real affection for. If you learned that he was the pixie in the case, you wouldn't expose him, would you? Better keep your muzzle out of this."

But in the end his curiosity won, as usual. The wonder was that his better judgment kept on trying.

He got hold of Bruce Inglehart. The young reporter had a reputation for discretion.

Johnny explained: "He gave himself ze Messuen treatment—you know, ze spinar injection—to see what it would do to a man. Zat was a week ago. Should have worked by now. But he says it had no effect. Maybe not. But day after ze dose, awr zese sings start happening. Very eraborate jokes. Kind a crazy scientific genius would do. If it's him, I mus' stop him before he makes rear trouble. You wirr he'p me?"

"Sure, Johnny. Shake on it."

Johnny extended his paw.

IT WAS two nights later that Duffee Hall caught fire. Yale had been discussing the erasure of this singularly ugly and useless building for forty years. It had been vacant for some time, except for the bursar's office in the basement.

About ten o'clock an undergraduate noticed little red tongues of flame crawling up the roof. He gave the alarm at once. The New Haven fire department was not to be blamed for the fact that the fire spread as fast as if the building had been soaked in kerosene. By the time they, and about a thousand spectators, had arrived, the whole center of the building was going up with a fine roar and crackle. The assistant bursar bravely dashed into the building and reappeared with an armful of papers, which later turned out to be a pile of quite useless examination forms. The fire department squirted enough water onto the burning section to put out Mount Vesuvius. Some of them climbed ladders at the ends of the building to chop holes in the roof.

The water seemed to have no effect. So the fire department called some more apparatus, connected up more hoses, and squirted more water. The undergraduates yelled:

"Rah, rah, fire department! Rah, rah, fire! Go get 'em, department! Hold that line, fire!"

Johnny Black bumped into Bruce Inglehart, who was dodging about in the crowd with a pad and pencil, trying to get information for his *New Haven Courier*. Inglehart asked Johnny whether he knew anything.

Johnny, in his deliberate manner, said: "I know one sing. Zat is ze firs' heatress fire I have seen."

Inglehart looked at Johnny, then at the conflagration. "My gosh!" he said. "We ought to feel the radiation here, oughtn't we? Heatless fire

is right. Another superscientific joke, you suppose?"

"We can rook around," said Johnny. Turning their backs on the conflagration, they began searching among the shrubbery and railings along Elm Street.

"Woof!" said Johnny. "Come here, Bruce!"

In a patch of shadow stood Professor Ira Methuen and a tripod whereon was mounted a motion-picture projector. It took Johnny a second to distinguish which was which.

Methuen seemed uneasily poised on the verge of flight. He said: "Why, hello, Johnny, why aren't you asleep? I just found this . . . uh . . . this projector—"

Johnny, thinking fast, slapped the projector with his paw. Methuen caught it as it toppled. Its whirl ceased. At the same instant the fire went out, vanished utterly. The roar and crackle still came from the place where the fire had been. But there was no fire. There was not even a burned place in the roof, off which gallons of water were still pouring. The fire department looked at one another foolishly.

While Johnny's and Inglehart's pupils were still expanding in the sudden darkness, Methuen and his projector vanished. They got a glimpse of him galloping around the College Street corner, lugging the tripod. They ran after him. A few undergraduates ran after Johnny and Inglehart, being moved by the instinct that makes dogs chase automobiles.

They caught sight of Methuen, lost him, and caught sight of him again. Inglehart was not built for running, and Johnny's eyesight was an affair of limited objectives. Johnny opened up when it became evident that Methuen was heading for the old Phelps mansion, where he,

Johnny, and several unmarried instructors lived. Everybody in the house had gone to see the fire. Methuen dashed in the front door three jumps ahead of Johnny and slammed it in the bear's face.

Johnny padded around in the dark with the idea of attacking a window. But while he was making up his mind, something happened to the front steps under him. They became slicker than the smoothest ice. Down the steps went Johnny, *bump-bump-bump*.

Johnny picked himself up in no pleasant mood. So this was the sort of treatment he got from the one man— But then, he reflected, if Methuen was really crazy, you couldn't blame him.

SOME of the undergraduates caught up with them. These crowded toward the mansion—until their feet went out from under them as if they were wearing invisible roller skates. They tried to get up, and fell again, sliding down the slight grade of the crown of the road into heaps in the gutter. They retired on hands and knees, their clothes showing large holes.

A police car drove up and tried to stop. Apparently neither brakes nor tires would hold. It skidded about, banged against the curb once, and finally stopped down the street beyond the slippery zone. The cop—he was a fairly important cop; a captain—got out and charged the mansion.

He fell down, too. He tried to keep going on hands and knees. But every time he applied a horizontal component of force to a hand or knee, the hand or knee simply slid backward. The sight reminded Johnny of the efforts of those garter snakes to crawl on the smooth con-

crete floor of the Central Park Zoo monkey house.

When the police captain gave up and tried to retreat, the laws of friction came back on. But when he stood up, all his clothes below the waist, except his shoes, disintegrated into a cloud of textile fibers.

"My word!" said the English zoologist, who had just arrived. "Just like one of those Etruscan statues, don't you know?"

The police captain bawled at Bruce Inglehart: "Hey, you, for gossakes gimme a handkerchief!"

"What's the matter; got a cold?" asked Inglehart innocently.

"No, you dope! You know what I want it for!"

Inglehart suggested that a better idea would be for the captain to use his coat as an apron. While the captain was knotting the sleeves behind his back, Inglehart and Johnny explained their version of the situation to him.

"Hm-m-m," said the captain. "We don't want nobody to get hurt, or the place to get damaged. But suppose he's got a death ray or sumpm?"

"I don't sink so," said Johnny. "He has not hurt anybody. Jus' prayed jokes."

The captain thought for a few seconds of ringing up headquarters and having them send an emergency truck. But the credit for overpowering a dangerous maniac single-handed was too tempting. He said: "How'll we get into the place, if he can make everything so slippery?"

They thought. Johnny said: "Can you get one of zose sings wiss a wood stick and a rubber cup on end?"

The captain frowned. Johnny made motions. Inglehart said: "Oh, you mean the plumber's friend! Sure. You wait. I'll get one. See if you can find a key to the place."

THE ASSAULT on Methuen's stronghold was made on all fours. The captain, in front, jammed the end of the plumber's friend against the rise of the lowest front step. If Methuen could abolish friction, he had not discovered how to get rid of barometric pressure. The rubber cup held, and the cop pulled himself, Inglehart and Johnny after him. By using the instrument on successive steps, they mounted them. Then the captain anchored them to the front door and pulled them up to it. He hauled himself to his feet by the door handle, and opened the door with a key borrowed from Dr. Wendell Cook.

At one window, Methuen crouched behind a thing like a surveyor's transit. He swiveled the thing toward them, and made adjustments. The captain and Inglehart, feeling their shoes grip the floor, gathered themselves to jump. But Methuen got the contraption going, and their feet went out from under them.

Johnny used his head. He was standing next to the door. He lay down, braced his hind feet against the door frame, and kicked out. His body whizzed across the frictionless floor and bowled over Methuen and his contraption.

The professor offered no more resistance. He seemed more amused than anything, despite the lump that was growing on his forehead. He said: "My, my, you fellows *are* persistent. I suppose you're going to take me off to some asylum. I thought you and you"—he indicated Inglehart and Johnny—"were friends of mine. Oh, well, it doesn't matter."

The captain growled: "What did you do to my pants?"

"Simple. My telelubricator here neutralizes the interatomic bonds on

the surface of any solid on which the beam falls. So the surface, to a depth of a few molecules, is put in the condition of a supercooled liquid as long as the beam is focused on it. Since the liquid form of any compound will wet the solid form, you have perfect lubrication."

"But my pants—"

"They were held together by friction between the fibers, weren't they? And I have a lot more inventions like that. My soft-speaker and my three-dimensional projector, for instance, are—"

Inglehart interrupted: "Is that how you made that phony fire, and that whatchamacallit that scared the people at the dinner? With a three-dimensional projector?"

"Yes, of course, though, to be exact, it took two projectors at right angles, and a phonograph and amplifier to give the sound effect. It was amusing, wasn't it?"

"But," wailed Johnny, "why do you *do zese* sings? You trying to ruin your career?"

Methuen shrugged. "It doesn't matter. Nothing matters. Johnny, as you'd know if you were in my . . . uh . . . condition. And now, gentlemen, where do you want me to go? Wherever it is, I'll find something amusing there."

DR. WENDELL COOK visited Ira Methuen on the first day of his incarceration in the New Haven Hospital. In ordinary conversation Methuen seemed sane enough, and quite agreeable. He readily admitted that he had been the one responsible for the jokes. He explained: "I painted your and Dalrymple's face with a high-powered needle sprayer I invented. It's a most amusing little thing. Fits in your hand and discharges through a ring on your finger. With your thumb you can

regulate the amount of acetone mixed in with the water, which in turn controls the surface tension and therefore the point at which the needle spray breaks up into droplets. I made the spray break up just before it reached your face. You were a sight, Cook, especially when you found out what was wrong with you. You looked almost as funny as the day I painted those feet on my rubbers and substituted them for yours. You react so beautifully to having your dignity pricked. You always were a pompous ass, you know."

Cook puffed out his cheeks and controlled himself. After all, the poor man was mad. These absurd outbursts about Cook's pompousness proved it. He said sadly: "Dalrymple's leaving tomorrow night. He was most displeased about the face-painting episode, and when he found that you were under observation, he told me that no useful purpose would be served by his remaining here. I'm afraid that's the end of our endowment. Unless you can pull yourself together and tell us what's happened to you and how to cure it."

Ira Methuen laughed. "Pull myself together? I am all in one piece, I assure you. And I've told you what's the matter with me, as you put it. I gave myself my own treatment. As for curing it, I wouldn't tell you how even if I knew. I wouldn't give up my present condition for anything. I at last realize that nothing really matters, including endowments. I shall be taken care of, and I will devote myself to amusing myself as I see fit."

JOHNNY had been haunting Cook's office all day. He waylaid the president when the latter returned from the hospital.

Cook told Johnny what had happened. He said: "He seems to be

completely irresponsible. We'll have to get in touch with his son, and have a guardian appointed. And we'll have to do something about you, Johnny."

Johnny didn't relish the prospect of the "something." He knew he had no legal status other than that of a tamed wild animal. The fact that Methuen technically owned him was his only protection if somebody took a notion to shoot him during bear-hunting season. And he was not enthusiastic about Ralph Methuen. Ralph was a very average young schoolteacher without his father's scientific acumen or whimsical humor. Finding Johnny on his hands, his reaction would be to give Johnny to a zoo or something.

He put his paws on Miss Prescott's desk and asked: "Hey, good-rooking, wurr you cawr up Bruce Inglehart at ze *Courier*?"

"Johnny," said the president's secretary, "you get fresher every day."

"Ze bad influence of ze undergraduates. Wurr you cawr Mr. Inglehart, beautifur?" Miss Prescott, who was not, did so.

Bruce Inglehart arrived at the Phelps mansion to find Johnny taking a shower. Johnny was also making a horrible bawling noise. "Waaaaaa!" he howled. "Hooooooooo! Yrrrrrrr! Waaaaaaa!"

"Whatcha doing?" yelled Inglehart.

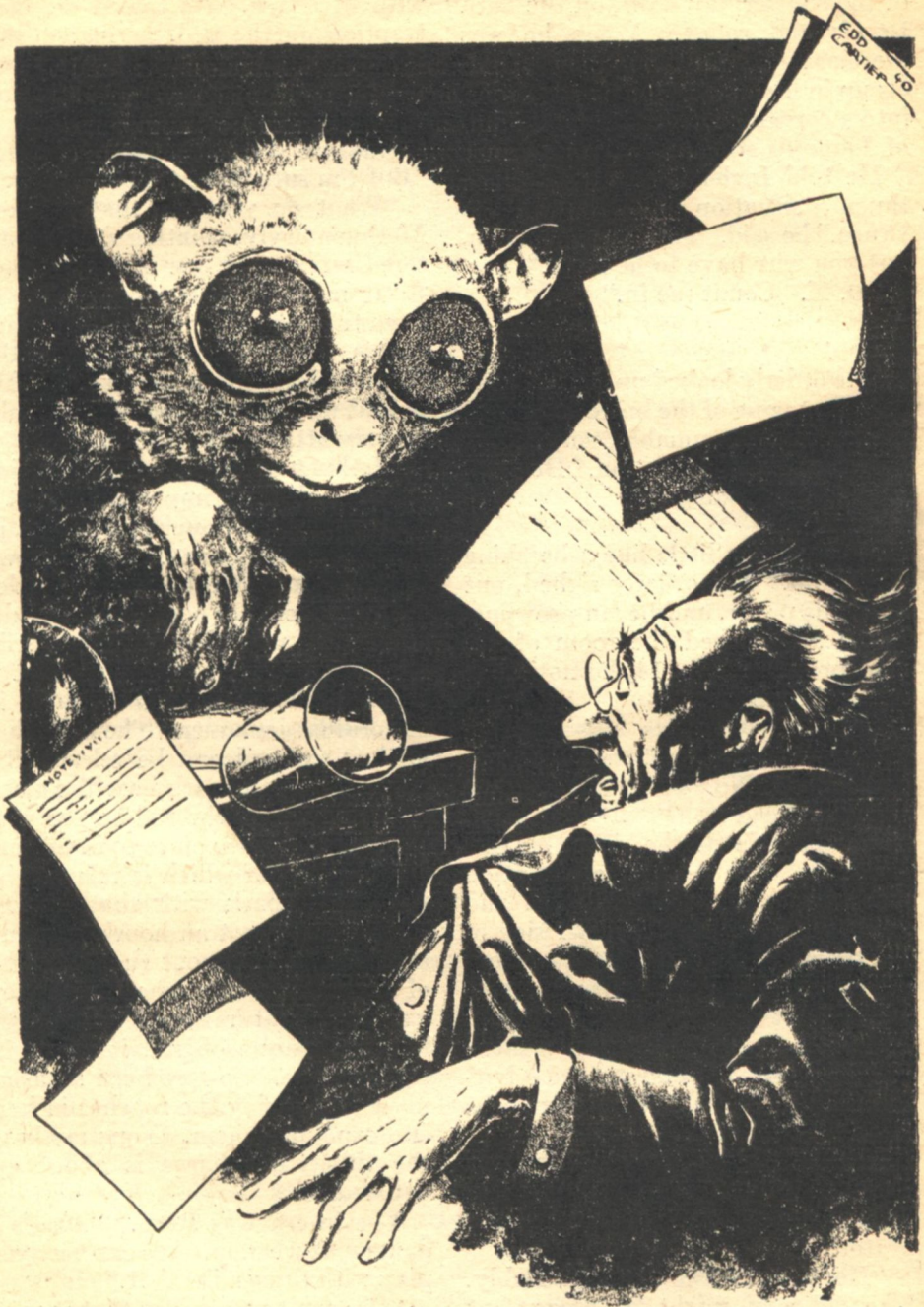
"Taking a bass," replied Johnny. "Wuuuuuuuh!"

"Are you sick?"

"No. Jus' singing in bass. People sing whire taking bass; why shouldn't I? Yaaaaaaaaa!"

"Well, for Pete's sake don't. It sounds like you were having your throat cut. What's the idea of these bath towels spread all over the floor?"

"I show you." Johnny came out



“—for it’s understandable that a madman who is also a first-rate genius, could play some remarkable pranks—”

of the shower, lay down on the bath towels and rolled. When he was more or less dry, he scooped the towels up in his forepaws and hove them into a corner. Neatness was not one of Johnny's strong points.

He told Inglehart about the Methuen situation. "Rook here, Bruce," he said, "I sink I can fix him, but you wirr have to he'p me."

"O. K. Count me in."

Pop!

The orderly looked up from his paper. But none of the buttons showed a light. So, presumably, none of the patients wanted attention. He went back to his reading.

Pop!

It sounded a little like a breaking light bulb. The orderly sighed, put away his paper, and began prowling. As he approached the room of the mad professor, No. 14, he noticed a smell of limburger.

Pop!

There was no doubt that the noise came from No. 14. The orderly stuck his head in.

At one side of the room sat Ira Methuen. He held a contraption made of a length of glass rod and assorted wires. At the other side of the room, on the floor, lay a number of crumbs of cheese. A cockroach scuttled out of the shadows and made for the crumbs. Methuen sighted along his glass rod and pressed a button. *Pop!* A flash, and there was no more cockroach.

Methuen swung the rod toward the orderly. "Stand back, sir! I'm Buck Rogers, and this is my disintegrator!"

"Hey," said the orderly feebly. The old goof might be crazy, but after what happened to the roach—He ducked out and summoned a squad of interns.

But the interns had no trouble

with Methuen. He tossed the contraption on the bed, saying: "If I thought it mattered, I'd raise a hell of a stink about cockroaches in a supposedly sanitary hospital."

One of the interns protested: "But I'm sure there aren't any here."

"What do you call that?" asked Methuen dryly, pointing at the shattered remains of one of his victims.

"It must have been attracted in from the outside by the smell of that cheese. *Phew!* Judson, clean up the floor. What is this, professor?" He picked up the rod and the flashlight battery attached to it.

Methuen waved a deprecating hand. "Nothing important. Just a little gadget I thought up. By applying the right e.m.f. to pure crown glass, it's possible to raise its index of refraction to a remarkable degree. The result is that light striking the glass is so slowed up that it takes weeks to pass through it in the ordinary manner. The light that is thus trapped can be released by making a small spark near the glass. So I simply lay the rod on the window sill all afternoon to soak up sunlight, a part of which is released by making a spark with that button. Thus I can shoot an hour's accumulated light-energy out the front end of the rod in a very small fraction of a second. Naturally when this beam hits an opaque object, it raises its temperature. So I've been amusing myself by luring the roaches in here and exploding them. You may have the thing; its charge is about exhausted."

The intern was stern. "That's a dangerous weapon. We can't let you play with things like that."

"Oh, can't you? Not that it matters, but I'm only staying here because I'm taken care of. I can walk out any time I like."

"No you can't, professor. You're

under a temporary commitment for observation."

"That's all right, son. I still say I can walk out whenever I feel like it. I just don't care much whether I do or not." With which Methuen began tuning the radio by his bed, ignoring the interns.

EXACTLY twelve hours later, at 10 a. m., Ira Methuen's room in the hospital was found to be vacant. A search of the hospital failed to locate him. The only clue to his disappearance was the fact that his radio had been disemboweled. Tubes, wires, and condensers lay in untidy heaps on the floor.

The New Haven police cars received instructions to look for a tall, thin man with gray hair and goatee, probably armed with death rays, disintegrators, and all the other advanced weapons of fact and fiction.

For hours they scoured the city with screaming sirens. They finally located the menacing madman, sitting placidly on a park bench three blocks from the hospital and reading a newspaper. Far from resisting, he grinned at them and looked at his watch. "Three hours and forty-eight minutes. Not bad, boys, not bad, considering how carefully I hid myself."

One of the cops pounced on a bulge in Methuen's pocket. The bulge was made by another wire contraption. Methuen shrugged. "My hyperbolic solenoid. Gives you a conical magnetic field, and enables you to manipulate ferrous objects at a distance. I picked the lock of the door to the elevators with it."

When Bruce Inglehart arrived at the hospital about four, he was told Methuen was asleep. That was amended to the statement that Methuen was getting up, and could see a visitor in a few minutes. He found

Methuen in a dressing gown.

Methuen said: "Hello, Bruce. They had me wrapped up in a wet sheet, like a mummy. It's swell for naps; relaxes you. I told 'em they could do it whenever they liked. I think they were annoyed about my getting out."

Inglehart was slightly embarrassed.

Methuen said: "Don't worry; I'm not mad at you. I realize that nothing matters, including resentments. And I've had a most amusing time here. Just watch them fizz the next time I escape."

"But don't you care about your future?" said Inglehart. "They'll transfer you to a padded cell at Middletown—"

Methuen waved a hand. "That doesn't bother me. I'll have fun there, too."

"But how about Johnny Black, and Dalrymple's endowment?"

"I don't give a damn what happens to them."

Here the orderly stuck his head in the door briefly to check up on this unpredictable patient. The hospital, being short-handed, was unable to keep a continuous watch on him.

Methuen continued: "Not that I don't like Johnny. But when you get a real sense of proportion, like mine, you realize that humanity is nothing but a sort of skin disease on a ball of dirt, and that no effort beyond subsistence, shelter, and casual amusement is worth while. The State of Connecticut is willing to provide the first two for me, so I shall devote myself to the third. What's that you have there?"

Inglehart thought, "They're right; he's become a childishly irresponsible scientific genius." Keeping his back to the door, the reporter brought out his family heirloom: a big silver pocket flask dating back to the fabu-

lous prohibition period. His aunt Martha had left it to him, and he himself expected to will it to a museum.

"Apricot brandy," he murmured. Johnny had tipped him off to Methuen's tastes.

"Now, Bruce, that's something sensible. Why didn't you bring it out sooner, instead of making futile appeals to my sense of duty?"

THE FLASK was empty. Ira Methuen sprawled in his chair. Now and then he passed a hand across his forehead. He said: "I can't believe it. I can't believe that I felt that way half an hour ago. O Lord, what have I done?"

"Plenty," said Inglehart.

Methuen was not acting at all drunk. He was full of sober remorse.

"I remember everything—those inventions that popped out of my mind, everything. But I didn't care. How did you know alcohol would counteract the Methuen injection?"

"Johnny figured it out. He looked up its effects, and discovered that in massive doses it coagulates the proteins in the nerve cells. He guessed it would lower their conductivity to counteract the increased conductivity through the gaps between them that your treatment causes."

"So," said Methuen, "when I'm sober I'm drunk, and when I'm drunk I'm sober. But what'll we do about the endowment—my new department and the laboratory and everything?"

"I don't know. Dalrymple's leaving tonight; he had to stay over a day on account of some trustee business. And they won't let you out for a while yet, even when they know about the alcohol counter-treatment. Better think of something quick, because the visiting period is pretty near up."

Methuen thought. He said: "I remember how all those inventions work, though I couldn't possibly invent any more of them unless I went back to the other condition." He shuddered. "There's the soft-speaker, for instance—"

"What's that?"

"It's like a loud-speaker, only it doesn't speak loudly. It throws a supersonic beam, modulated by the human voice to give the effect of audible sound-frequencies when it hits the human ear. Since you can throw a supersonic beam almost as accurately as you can throw a light beam, you can turn the soft-speaker on a person, who will then hear a still small voice in his ear apparently coming from nowhere. I tried it on Dugan one day. It worked. Could you do anything with that?"

"I don't know. Maybe."

"I hope you can. This is terrible. I thought I was perfectly sane and rational. Maybe I was— Maybe nothing is important. But I don't feel that way now, and I don't want to feel that way again—"

THE omnipresent ivy, of which Yale is so proud, affords splendid handholds for climbing. Bruce Inglehart, keeping an eye peeled for campus cops, swarmed up the big tower at the corner of Bingham Hall. Below, in the dark, Johnny waited.

Presently the end of a clothesline came dangling down. Johnny inserted the hook in the end of the rope ladder into the loop in the end of the line. Inglehart hauled the ladder up and secured it, wishing that he and Johnny could change bodies for a while. That climb up the ivy had scared him and winded him badly. But he could climb ivy and Johnny couldn't.

The ladder creaked under Johnny's five hundred pounds. A few

minutes later it slid slowly, jerkily up the wall, like a giant centipede. Then Inglehart, Johnny, ladder, and all were on top of the tower.

Inglehart got out the soft-speaker and trained the telescopic sight on the window of Dalrymple's room in the Taft, across the intersection of College and Chapel Streets. He found the yellow rectangle of light. He could see into about half the room. His heart skipped a few beats until a stocky figure moved into his field of vision. Dalrymple had not yet left. But he was packing a couple of suitcases.

Inglehart slipped the transmitter clip around his neck, so that the transmitter nestled against his larynx. The next time Dalrymple appeared, Inglehart focused the crosshairs on the steel man's head. He spoke: "Hanscom Dalrymple!" He saw the man stop suddenly. He repeated: "Hanscom Dalrymple!"

"Huh?" said Dalrymple. "Who the hell are you? Where the hell are you?" Inglehart could not hear him, of course, but he could guess.

Inglehart said, in solemn tones: "I am your conscience."

By now Dalrymple's agitation was evident even at that distance. Inglehart continued: "Who squeezed out all the common stockholders of Hephaestus Steel in that phony reorganization?" Pause. "You did, Hanscom Dalrymple!"

"Who bribed a United States senator to swing the vote for a higher steel tariff, with fifty thousand dollars and a promise of fifty thousand more, which was never paid?" Pause. "You did, Hanscom Dalrymple!"

"Who promised Wendell Cook the money for a new biophysics building, and then let his greed get the better of him and backed out on the thin excuse that the man who was to

have headed the new department had had a nervous breakdown?" Pause, while Inglehart reflected that "nervous breakdown" was merely a nice way of saying "gone nuts." "You did, Hanscom Dalrymple!"

"Do you know what'll happen to you if you don't atone, Dalrymple? You'll be reincarnated as a spider, and probably caught by a wasp and used as live fodder for her larvæ. How will you like that, *heh-heh?*"

"What can you do to atone? Don't be a sap. Call up Cook. Tell him you've changed your mind, and are renewing your offer!" Pause. "Well, what are you waiting for? Tell him you're not only renewing it, but doubling it!" Pause. "Tell him—"

But at this point Dalrymple moved swiftly to the telephone. Inglehart said, "Ah, that's better, Dalrymple," and shut off the machine.

Johnny asked: "How did you know awr zose sings about him?"

"I got his belief in reincarnation out of his obit down at the shop. And one of our rewrite men who used to work in Washington says everybody down there knows about the other things. Only you can't print a thing like that unless you have evidence to back it up."

THEY LOWERED the rope ladder and reversed the process by which they had come up. They gathered up their stuff and started for the Phelps mansion. But as they rounded the corner of Bingham they almost ran into a familiar storklike figure. Methuen was just setting up another contraption at the corner of Welch.

"Hello," he said.

Man and bear gaped at him. Inglehart asked: "Did you escape again?"

"Uh-huh. When I sobered up and got my point of view back. It was

easy, even though they'd taken my radio away. I invented a hypnotizer, using a light bulb and a rheostat made of wire from my mattress, and hypnotized the orderly into giving me his uniform and opening the doors for me. My, my, that *was* amusing."

"What are you doing now?" Inglehart became aware that Johnny's black pelt had melted off into the darkness.

"This? Oh, I dropped around home and knocked together an improved soft-speaker. This one'll work through masonry walls. I'm going to put all the undergraduates to sleep and tell 'em they're monkeys. When they wake up, it will be most amusing to see them running around on all fours and scratching and climbing the chandeliers. They're practically monkeys to begin with, so it shouldn't be difficult."

"But you can't, professor! Johnny and I just went to a lot of trouble getting Dalrymple to renew his offer. You don't want to let us down, do you?"

"What you and Johnny do doesn't matter to me in the slightest. Nothing matters. I'm going to have my fun. And don't try to interfere, Bruce." Methuen pointed another glass rod at Inglehart's middle. "You're a nice young fellow, and it would be too bad if I had to let you have three hours' accumulation of sun-ray energy all at once."

"But this afternoon you said—"

"I know what I said this afternoon. I was drunk and back in my old state of mind, full of responsibility and conscientiousness and such bunk. I'll never touch the stuff again if it has that effect on me. Only a man who has received the Methuen treatment can appreciate the futility of all human effort."

Methuen shrank back into the

shadows as a couple of undergraduates passed. Then he resumed work on his contraption, using one hand and keeping Inglehart covered with the other. Inglehart, not knowing what else to do, asked him questions about the machine. Methuen responded with a string of technical jargon. Inglehart wondered desperately what to do. He was not an outstandingly brave young man, especially in the face of a gun or its equivalent. Methuen's bony hand never wavered. He made the adjustments on his machine mostly by feel.

"Now," he said, "that ought to be about right. This contains a tonic metronome that will send them a note of frequency of 349 cycles a second, with 68.4 pulses of sound a minute. This, for various technical reasons, has the maximum hypnotic effect. From here I can rake the colleges along College Street—" He made a final adjustment. "This will be the most amusing joke yet. And the cream of it is that, since Connecticut is determined to consider me insane, they can't do anything to me for it! Here goes, Bruce— *Phew*, has somebody started a still here, or what? I've been smelling and tasting alcohol for the last five minutes—*ouch!*"

The glass rod gave one dazzling flash, and then Johnny's hairy black body catapulted out of the darkness. Down went Ira Methuen, all the wind knocked out of him.

"Quick, Bruce!" barked Johnny. "Pick up zat needre spray I dropped. Unscrew ze container on ze bottom. Don't spirr it. Zen come here and pour it down his throat!"

This was done; with Johnny holding Methuen's jaws apart with his claws, like Sampson slaying the lion only conversely.

They waited a few minutes for the

alcohol to take effect, listening for sounds that they had been discovered. But the colleges were silent save for the occasional tick of a typewriter.

Johnny explained: "I ran home and got ze needre sprayer from his room. Zen I got Webb, ze research assistant in biophysics, to ret me in ze laboratory for ze archohor. Zen I try to sneak up and squirt a spray in his mouse whire he talks. I get some in, but I don't get ze sprayer adjusted right, and ze spray hit him before it breaks up, and stings him. I don't have fingers, you know. So we have to use what ze books cawr brute force."

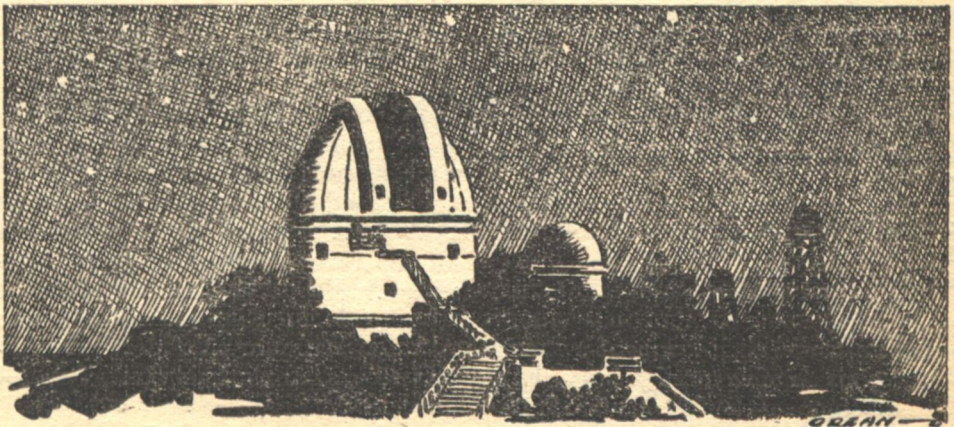
Methuen began to show signs of normalcy. As without his glass rod he was just a harmless old professor, Johnny let him up. His words tumbled out: "I'm so glad you did, Johnny—you saved my reputation, maybe my life. Those fatheads at the hospital wouldn't believe I had to be kept full of alcohol, so, of course, I sobered up and went crazy again—maybe they'll believe now. Come on; let's get back there quickly. If they haven't discovered

my absence, they might be willing to keep this last escape quiet. When they let me out, I'll work on a permanent cure for the Methuen treatment. I'll find it, if I don't die of stomach ulcers from all the alcohol I'll have to drink."

JOHNNY waddled up Temple Street to his home, feeling rather smug about his ability as a fixer. Maybe Methuen, sober, was right about the futility of it all. But if such a philosophy led to the upsetting of Johnny's pleasant existence, Johnny preferred Methuen drunk.

He was glad Methuen would soon be well and coming home. Methuen was the only man he had any sentimental regard for. But as long as Methuen was shut up, Johnny was going to take advantage of that fact. When he reached the Phelps mansion, instead of going directly in, he thrust a foreleg around behind the hedge next to the wall. It came out with a huge slab of chewing tobacco. Johnny bit off about half the slab, thrust the rest back in its cache, and went in, drooling happily a little at each step. Why not?

THE END.



ONE WAS STUBBORN

By Rene La Fayette

Maybe if we'd all get together in our beliefs we could get rid of anything—or anyone—we didn't like, too!

Illustrated by Cartier

AUTHOR'S NOTE: This present manuscript is a paraphrase of one which is very strange indeed. I have included in it all its essentials and have removed from it only that which was rambling and incoherent. The original came to me in the hands of a peculiar old fellow who was admitted for treatment to Balm Springs. He had a very stubborn quality about him which made him nearly impossible to treat and this intractability earned for him the pseudonym of Old Shellback among the internes and psychiatrists.

Oddly, he came with no past history and refused to give any. No one could learn, for some time, where he had been born or whether he had any people alive. And then, one day, with a rock-jawed glare at my insistence, he said:

"My mother and father have yet to be born. If I have any ancestors living in this country now I am positive I won't see them. The place I was born will not be built for another three hundred years and, when I was born in it, it was already two hundred and fifty years old. It is gone because it has yet to exist. It will be gone thereafter because it will cease to exist.

"I am a negative five hundred and ninety years old. Tomorrow, my birthday, I shall be a negative five hundred and eighty-nine. I have less than thirty years of life expectancy remaining to me and so I shall not live to be more than a negative five hundred and sixty years.

"What has happened to me has happened because of what happened to the Universe. But mainly because there is but one god and his name will be George Smiley.

"You haven't tried to make me do anything. Therefore I shall give you the manuscript which explains this. I wrote it when I was marooned a little while, about eighty years from now, in Paris just after the United States began to rebuild it."

And so he brought me the manuscript. It had evidently been written under stress,

for the first half dozen pages are illegible as compared to the graceful script of the remainder.

Old Shellback grew restless after he had been with us six or seven months, for he seemed to sense danger in all clocks. In fact a man had only to take out a watch and Old Shellback would dive for his cubicle and refuse to come forth the rest of the day. Then he began to mutter, over and over, "Not far enough back. Not far enough back. Not far enough back." Nothing could be found as the cause of this, but Old Shellback seemed to think the menace quite valid. And then one day he came rushing into my office—it was a New Year's Day—and demanded his original manuscript which, of course, I gave him. I had no thought of what he might do and what he did was quite startling.

Old Shellback was seen to lock himself into his room. There was no egress therefrom.

An hour later, when he would not respond, we forced the door.

On the bed was a scrawled note:

"My apologies to Dr. LaFayette. But this is not far enough back, you see. Not far enough back."

Old Shellback was gone!

I THOUGHT it was my vision.

For some time my wife had been nagging me about glasses, telling me that I ought to get those Brilloscopes that were always being advertised on the three dimensional color television. But somehow the more I heard, "See like a cat and feel like a million with Brilloscopes, the Invisible Optic Aids," the less inclined I was to get a pair.

And so when I beheld a pair of legs walking toward me all by them-



The instant he forgot to think about the ground under his feet, he was falling again.

selves, I, of course, concluded that it was my vision. In fact, for some days things had been getting slightly misty and the mist was deepening.

AST—6

But to see a pair of legs with pants neatly pressed and shoes precisely tied walk up to you and by you and around the corners—well, even I

could see that I must give in.

I stepped onto the express conveyor belt and went whizzing off toward the Medical Center, and as I sped along I again received a shock. The great glistening domes of Science Center, usually so plainly seen from all levels of the city save the third trucking tier under the glass subways, were missing one of their number. I supposed, of course, that the Transtellar Express might have swished too close to it on the night before, but I was wrong. For when I diverted my eyes for a moment to avoid being struck by a fat woman's antigravity cane and then looked through the invisible super levels at the place where the dome had been, the dome was back in place! I certainly did need glasses! I was so groggy when I stepped off the conveyor belt and grabbed the scoop which lifted up to the medical department level that I didn't even see a crazy college student swing off Level 20 in his antique Airable Swishabout—one of those things with signs over the dents saying, "Eve, Here's Your Atom," and "Ten Tubes All Disintegrating," and "Hey, Babe, didn't we meet on Mars?" You know the menace. Well, one of those blasted straight at me and I didn't even have time to duck—and I probably couldn't have anyway, thanks to my rheumatism.

And if I had been startled before I was prostrate now. That Swishabout rattled to the right and left and above and below and was gone. I'd passed all the way through it!

I was almost scared to let go of the bucket and step out on the Eye Level for fear the invisible walk was not only invisible but also not there!

Somehow I hauled myself up to the sorting psycher while the beam

calculators sized me up and then, when the flasher had blinked "Dr. Flerry" as its decision for me, I managed to sink down on the sofa which whisked me into his office.

The nurse smiled pleasantly and said, "Nervous disability is quite easy to correct and Dr. Flerry is expert. Please be calm."

"I haven't got any nervous disability," I said. "I came up here to get tested for some glasses."

She looked at one of those confounded charts that the sorting psycher forwards ahead of the patient, and when I saw her finger come down to "Stubborn" I knew she'd nod. She did. A thoroughly unmanageable young woman.

"You haven't been brought to an eye doctor," she said. "Dr. Flerry treats nervous disability only, as you must know."

"I came for an eye test," I said, "and I'm going to get an eye test. I don't give a flimdoodle what that blathery card says; it's *eyes*. Do you think a machine knows more about me than I do?"

"Sometimes a machine does. Now please don't get upset."

"I'm not upset. I guess I know when I need glasses and when I don't need glasses. And if I want to be tested for glasses I pretty well guess I'll be tested for glasses!"

"You," she said, "are obviously a stubborn sort of fellow."

"I guess," I said, "that I am the most stubborn fellow in this city if not in this whole country."

"Don't tell me," she said.

WELL, I don't know why, but I felt a little better after that. And shortly, Dr. Flerry buzzed me into his inner office. He was one of these disgusting young fellows who think they know so much about the hu-

man body that they themselves can't be human.

"Now be calm," he said, "and tell me just what the trouble is." He seemed to be in a sort of ecstatic state and he didn't seem to take me seriously enough.

"I won't be calm," I said, "and I don't have to tell you what the trouble is. You've got a psycher chart there that will tell you all about me even down to my last wart."

"Yes," he said, "you do have a wart. I shall have Dr. Dremster remove it before you go."

"You won't touch any wart of mine," I said. "I came in here to get a pair of glasses, and by the eternal, I'll get them if I have to sit here all night."

I guess I had him there, for he sat and stared at me for some little time before he replied.

Finally he said, "Now just what is making you nervous."

"I am *not* nervous!" I shouted. "I want glasses!"

"Ah," he said. And then he sat back and pushed his head against a pad so the mechanical chair arm would put a lighted cigarette in his mouth. "My dear fellow, tell me just why you need a pair of glasses."

"Because I need them, that's why!"

"Reading glasses?"

"Reading glasses!" I said. "I never read any of the bilge the papers are ordered to publish."

"Then you watch the televisior quite a bit?"

"I wouldn't turn one of those things on for a million dollars. What do you ever hear but advertising and smoky bands, and what do you see but girls with legs? Bah!" I guess I was telling him now.

"Ah," he said and thumped back with an elbow so that his chair's

arm would pour him a glass of water. "But you don't need glasses to talk to people."

"I never talk to people. I never talk to anybody except my wife and I don't talk to her and she doesn't listen to me any more than I listen to her. She never says three words a week to me anyway." Which is the way things should be, of course.

"What, may I ask, is your business?"

"You've got a nerve to ask, but for your information I haven't got any business. I retired off my farm about four years ago and I haven't spent a happy hour since."

"Ah," he said.

"Don't sit there saying 'Ah' like an idiot," I said. "Get busy and fit me with a pair of glasses."

"You haven't said why you needed them. You can have them of course, but to give them to you I'll have to know just what sort of glasses you mean. What convinced you that you should have them?"

I COULD SEE that I had scared Dr. Flerry into being polite to me so I told him that I had seen a pair of legs without a torso and had first missed and then seen one of the Medical Center domes and had then missed another and how that crazy college student had run right through me.

Well, if Dr. Flerry hadn't stopped laughing when he did I guess we would have mixed it up right then.

"What's so funny?" I demanded.

"Why, my dear fellow," said Dr. Flerry, "you don't need any glasses. If you ever paid any attention to the newspapers or the televisors or talked to anyone, you'd understand what is happening."

"And what," said I, "is happening?"

"Why, my dear fellow, is it pos-

sible that you haven't heard of the Messiah?"

"Him," I said. "What about him?"

"Would you care to come around to our meeting tonight? You might be edified."

"I don't like meetings. I don't believe in meetings."

"But my dear fellow, the Messiah will—"

"I don't believe in messiahs."

"Well, however that may be, I wonder at you. You are probably the only man in the world today who is not a follower. Let me explain to you what this is all about so that—"

"I don't want to know anything about it and I wouldn't believe it if I did."

"Nevertheless, let me tell you something of this. The Messiah from Arcturus' Arcton is teaching the nonexistence of matter. You see, by that he means that all matter is an idea. And it is high time that the world was relieved from the crushing load of materialism which has almost quenched the soul of man. Those are his words. And it's true. Man is being pushed all around by machines and the age of machines has been over for a century, but the machines just keep running, and man, because he is so lazy, keeps using them. Now it may surprise you that a man such as myself, dependent upon the ills of the body as I am, should advocate the loss of the body. But I get no real interest out of my trade for everything about the body is known except, of course, the soul and the Messiah has a good line on that. Further, in common with the rest of humanity, I am bored. I am so bored that I welcome any diversion. And I know that all this material

world and this body I drag around are useless sources of annoyance.

"Now the Messiah is teaching us the folly of belief. So long as we believe in this world, this Universe, in machines and ills and mankind, then mankind shall survive and the world, the Universe and machines shall survive. But as soon as we lose all belief in these things then we shall be freed. We shall be freed, my friend, from the agony caused by machine and other men. And, being slaves to cogwheels, the only answer is to abolish the very matter from which those same cogwheels and these bodies are made. Well! Matter does not really exist, you know. It is only a figment of our imaginations. We believe in matter and so there is matter. That, my dear fellow, is the glorious message you have missed by not listening or reading."

"You mean," I said, "that everybody belongs to this?"

"Certainly. Hasn't the whole world been miserable ever since all further advance was unattainable? And isn't this the one answer to our misery?"

"But . . . but where will everyone go?" I said.

"Why, we return to our proper position as a compound idea. And there we shall have nothing that is miserable or worrying—"

"But you won't even exist!"

"Certainly not," he said with a tired smile. And he nudged with his elbow and tilted his head back while his chair's arm poured another glass of water down his throat. Languidly then he nodded to me.

"You don't need glasses, my dear fellow. You are only witnessing the fruits of our combined disbelief. Several people happened to disbelieve that dome and then the college student probably didn't believe in his

Swishabout and you, about to be killed by it, refused to believe in it either. So come around to our meeting tonight and hear all about it. It is really quite fascinating." He yawned in boredom and pushed a pedal which shot my sofa car out to the Eye Level again.

I stepped on a down bucket. Wouldn't it be awful, I thought, if this bucket didn't exist? But it evidently still did and nothing happened until I was being speeded home on the conveyors.

The Trans-System 5:15 Local roared away from its field to the north and when it had attained the zenith it suddenly vanished. There wasn't so much as a puff of smoke left in the sky. And about ten seconds later it appeared again fifty or sixty miles up, visible because of its exhaust flames in the dusk.

When I got home I went to bed behind a locked door. The bed, at least, showed no sign of vanishing. And if things were going to persist in refusing to exist, I vowed I wouldn't leave that room until my condensochow and my stock of Old Space Ranger gave out.

I WENT OUT three times in three weeks and twice I came back so badly unnerved that again I barricaded myself. For the things which were happening clearly showed that the world had gone completely mad and maybe not only the world but the Universe as well. I recalled a fragment of talk I had heard concerning the disease, machine madness, and I was now convinced that the disease had invaded everyone. And that it was even invading me.

My wife hadn't spoken to me for so long that, one day when she stuck her head in the door and announced that a gentleman was here to see me, I noticed for the first time that all

was not well with her. She had a sort of ecstatic fixity about her face that could not even be broken by animosity toward me.

The gentleman came in. He had a robe of blue flashtex wrapped around him so that he was mostly hypnotic eyes. He said, "My name is George Smiley. I am called the Messiah!"

I must admit that I was never so close to being frightened in my life. He brought down his arm a little and exposed his face and if I have ever in my life seen anything sardonic it was the grin he wore. He was not handsome nor tall, but there was some kind of presence to him which would have singled him out from a million made up exactly like him.

"What do you want with me?" I said.

"I merely wish to speak with you."

"Then go ahead," I said.

"A Dr. Flerry, Number 483,936,-3297,024AG, has reported to me that you may be the one responsible for the way things are progressing. We have done away with the disbelief of some thousands like you and you are the last one. I understand that you have neither heard nor read of the Great Eclipse."

I couldn't look him in the eyes and so I watched the way his flashtex cape rippled. "All I know is what Dr. Flerry told me."

"And still you were not interested enough to attempt to believe with the rest?"

"Why should I be interested?" I said.

"Because this vitally concerns your happiness. Have you no wish to defeat the mechanism and organization which has enslaved mankind? Have you no desire to liberate yourself from the toils of a miserable existence?"

"I can do that with a splashgun," I said. "I don't have to believe in you to do it."

"Ah! And there you are wrong. If you kill yourself, you will not share. Is there no way to convince you that our precepts are the only precepts?"

"I can grow cabbage," I said. "And I can milk cows. And I have stayed healthy so far by not listening to anybody on the subject of anything. You are wasting your time with me."

"You mean you refuse?"

"I guess that's what I mean."

"You are a very stubborn man."

"I believe what I want to believe. I believe this is a world. And anybody that tries to tell me that this glass and bottle are not real is going to get an awful argument from me."

"Then," said George Smiley, the Messiah, "my hand is forced. I sent no minions. I came myself. You are the last man. I and the rest of the Universe shall cease to believe in your soul and you shall cease to exist. Good day."

"Good day," I said.

He looked back once from the door. I was trying to pour myself a drink but the bottle neck chattered against the glass and the Old Space Ranger spilled. I felt his eyes.

And then there weren't a bottle and a glass in my hands!

I held nothing!

"Good day," he said again in a cheerful voice. He was gone.

DURING the remainder of that day I did nothing more than sit and look at the patterns in the fluffoplex floor. I was half angry, half scared, and I was trying my best to understand just what George Smiley, the Messiah, was doing. I have been told that I have a suspicious nature.

However that may be, I suspected George Smiley. Every person I had seen for weeks, now that I came to think about it, had had that same strange fixity of expression which my wife had borne; just as though everyone had become a saint.

It was much against my principles to surrender to the extent of examining the problem but, at last, when night—as I thought—had come, I went into the next room and fumbled around until I found what papers my wife had accumulated during the past month or two. I sat and read, then, for nearly two hours.

But at the end of that time I was not even close to a solution. All I discovered was that George Smiley had come from Arcton with a message. Of course I knew that everyone in the Universe was bored and would welcome any kind of diversion and that such a time, according to my Tribbon's "Rise and Fall of the American Empire," provided unscrupulous men with a host of willing dupes for religious experimentation. That many of these had been maniacs was a fact which Tribbon, the great unbeliever, italicized. But, so far in history, no one man had managed to swing a nation, much less the Universe, around to his method of thinking. But it had been so long since any man had had to develop an original idea that almost any idea would have been acceptable. I suppose that it was the perfection of communication which made it possible for George Smiley to reach everyone everywhere. And the freedom which the Machine Magistrations gave all religious exponents accounted for George Smiley's not being stopped.

And, worse luck, it seemed that I was the only man left that didn't want to slip off into the limbo.

It had already been proved that mass concentration could do away with material objects but that fact was so old that, until now, it had lain dormant except in the pranks of schoolboys who, learning about it for the first time, vanished desks out from in front of their professors.

George Smiley, according to these reports, was a virile fellow who had lived alone for years and years as a prospector on Arcton. But the fact that his parents were not known made me believe that perhaps both his father and his mother had finished this life as members of the famous Arcton Prison to which so many universal criminals were shipped. Did this George Smiley have a grudge against the whole Universe?

That sardonic smile of his and those terrifying eyes—

Well! It wasn't going to do me any good to sit and moon over the papers. Besides I felt I had better put them back before my wife found that I was reading them. Such surrender was unthinkable. Accordingly I walked out into the living room—

And fell!

There must be ground under me!
I lit!

And then I sat there, staring all about me in helpless bewilderment.

There wasn't any living room any more. Maybe . . . maybe my own room—

No, there was no sign of that either.

The papers! The papers I had been holding in my hand—

For a second one sheet rustled and then it, too, faded away.

There was something solid under me but that was all the solidity anywhere.

The city, perhaps the world, perhaps everything was a flood of gray

and curling mist! I felt of myself and was relieved to know that I was still myself anyway. For an instant I had wondered and, wondering, had felt myself thin and pale. But I was again solid and that upon which I was seated was still ground and so I took slight heart.

What, I wondered, had happened to my wife? And what had happened to the house? And the city? Certainly there must be something left of the city. And I began to feel that if I couldn't find something of it I should certainly go mad.

No more condensochow. No more Old Space Ranger. Oh, my goodness, yes, I had to find the city.

I stood up and groped before me, my hands nearly invisible in the murk. Step by step I found ground and, once, I thought I saw the corner of a building but, when I approached it closely, it, too, was gone.

FOR WHAT seemed an hour I floundered about without being able to locate a street. I was getting angry, probably because I was getting scared. I consulted my watch and found out that it was half past ten. For what seemed a long while I kept on working along, expecting any moment to find a wall or a conveyor belt or a parked autoairbile but each next moment being disappointed. Finally I again looked at my watch; it was still half past ten. I thought that I must have missed the hands the first time in the absence of light but there was no missing them now, for the dial glowed softly and the mist itself seemed to have some quality of illumination. And then, having groped for what seemed yet a third half-hour, I looked once more at my watch. It was still half past ten!

Had something happened to Time?

Was I adrift in something which wasn't Space?

There were no quizclickers gaping for their pennies and their questions on each lamp-post any more, and so I had to try and answer it myself.

Yes, there was Space. I could feel myself and I knew I moved and so there must be Space. If it took me time to move— Perhaps, I thought, I had better locate some one else before I went completely mad.

For all this murk was seeping into my heart; like drifting smoke it curled and wound and spired, leaving black alleys stretching endlessly out and then rolling in upon the openings and swallowing them, leaving towers which stretched an infinity up and down and then devouring the towers. The very solidity on which I trod was hidden. There was no direction to anything and I felt that I might well be upside down or horizontal for all I knew. And I might not be walking on anything at all—

And at that thought I began to fall. And falling I feared earth. And fearing earth I landed. I was ill. The thought that I must keep earth in mind or fall again was enough to make me do just that. And when again I was upon solidity I understood that I might drop an infinity, step by step and never arrive at anything.

With great suddenness it came to me that so long as I believed in myself, I was. So long as I believed, there was space. I was adrift in a murky ocean of mist, drowned in an immensity of nothingness, marooned in nonexistence.

I must find somebody.

I could not tolerate being alone.

And so I stumbled forward, groping hopefully. I was not used to walking any more than anyone else

had been used to it. And I began to tire. I had fallen far I knew and, I supposed, I would have to rise again to the same altitude of the city's site before I could discover anything.

But I was wrong. I had begun to wish violently for a bucket to bear me upward and then, banging my shins, I ran into the bucket. I had been wandering so long and so far without any contacts that I gripped that bucket as one grips a lost friend found again. Joyously I put my feet upon it. Gratefully I sank into its fluffoplex arms. And upward I went.

I WAS almost certain now that I had sunk no lower than the fifth level subsurface, for there the buckets began and so I waited patiently for the conveyance to gently alight me upon a higher level. But I just kept on going up. Ordinarily it used to take a bucket not more than a minute to lift anyone twenty levels. But I realized that I had been sitting there at least five minutes, ascending swiftly through impenetrable mist.

In sudden panic I wondered where I was going. No bucket I had ever seen could have gone as high as this. Why . . . why I must be on a level with the Court Domes. Or— God help me, I must be about to crash through the Weather Roof!

Suddenly I beheld a glass pane above. The bucket hit it squarely and rebounded. Madly I gripped at the chair arms. What if this bucket should vanish? What if the bucket, too, should cease to be? And it did.

I fell through the giddy mist. Only an aircab could have saved me. And then I wasn't falling. I was sitting in an aircab.

For several seconds I just sat there, clinging thankfully to the seat,

not thinking at all about where I might be going. The driver must have seen me falling and zipped under me and was waiting now for me to recover my breath before he asked my destination. I leaned past the meter.

"Thank you," I said. "If you'll take me to the Food Central, I'll be very grateful."

A face . . . a face and nothing more glowed briefly above the bar control and a voice snarled, "You can't do this to me. Who the hell do you think you are?" And the face was gone and the aircab went purring along, utterly driverless.

I was shaken, for it took me some time to understand just what was happening to me. I felt that if I went on like this much longer without the solace of a drink, I should perish. Oh, for a little snort of Old Space Ranger!

I drank it off and instantly felt better.

And then I felt worse.

I hadn't been carrying a glass of Old Space Ranger around with me all this time! And there wasn't anyone about who could have placed it in my hand!

And yet I had just had a drink!

And instead of being in that aircab I was sitting on nothing!

What had happened to the aircab? Certainly I still must be in it!

And there I was purring along in the aircab again.

"Driver," I said, "I don't understand—"

"Don't try it on me!" snarled a face beside the meter. It vanished all but the eyes and these were so malevolent that I looked away.

The aircab vanished, too.

I sat very still on whatever this solidity was and tried to get myself straightened out. I had spoken to that driver twice and each time he

had almost appeared. And I felt that the next time I tried to bring him out he would certainly deal roughly with me after the way of hackies. Each time I had imagined things it seemed that those things had come to pass.

Was I, then, a figment of my own imagination?

Shiver the thought!

Could I bring anything I wanted into being with my own thought? In his "Rise and Fall of the American Empire," Tribbon hinted at the future possibility that the world and even the Universe might be destroyed by combined thought, the world and the Universe evidently being nothing but an idea. Had humanity committed mass suicide or mass combination to the exclusion of matter? And was I, then, the only one left whose belief in his own individuality was so great that that individuality still existed? And being the only individual mind still possessed by a man, could I create at will?

Or was I doomed forever and ever to drift aimlessly through this clammy mist, timeless and alone?

I could not bear the thought. Tribbon had stated that man's one redeeming feature was his own ability to create, and that he, therefore, assigned creativeness to God. And Tribbon had said that when man no longer created then man would no longer be. I had been the last manual farmer. Was I then the last man with ability to create?

Certainly if anything could be saved or if anything could exist, then it must be created by myself.

That was it!

I must create!

I GLOWED with the idea. I walked around on my created solidity and laughed aloud. Always before I had

had to callous my hands and besweat my brow but now I only had to think. And what things wouldn't I create! I came as close to dancing as I ever did in all my life.

The mist!

I would create sunlight!

With all my wit I concentrated and then! Then a shaft of light came from somewhere and played its beam upon me and warmed my rheumatic bones.

Sunlight!

By my own imagination I could bring to being light and warmth and cheer! I sang out, so great was my joy.

Now let me create a meadow. A meadow which I would surround with trees and cross with a brook. I closed my eyes and concentrated and, when I opened them again, there was the meadow!

I started to caper out into the tall grass and then, midpace, stopped dead still. What had happened to the sunlight? The mist so befogged this meadow that it could scarcely be seen. Sunlight!

Sunlight!

And there it came again, that pleasant, golden beam.

But as soon as the sunlight came, the meadow vanished!

How uncertain all this was! Was it possible that I could create but not enduringly? That I could create and maintain only one object at a time? Did these things depend wholly upon my ability to concentrate upon them?

And even while I pondered the question, the sunlight faded before the mist and I was again surrounded by the clammy grayness. But for all my disappointment, I had established one thing: that I could bring things into being even if I could not maintain them.

Certainly there must be some solution to this sort of thing. If I gave it enough thought, perhaps I could manage a way to trap sunlight and meadows into reality.

I sat down upon my solidity and pursed my lips and stroked my chin. Try as I might I could not remember if Tribbon had had anything to say upon the subject of concentration.

I thumbed hopefully through the index, but the only reference close to it was "Concentration Camps: New York, San Francisco, Washington." I stared into the mist a while and when I looked back at the book, it was gone. Oh, well, I thought, I would rather have some Old Space Ranger anyway.

I drank it off.

And it made me hungry.

So I ate the steak.

Feeling better, I again got restless. I could not sit around on an imagined solidity for all eternity. I could call down the sunlight at will, but I couldn't keep it there, and so I gave over. And then it occurred to me that the reason I thought I was standing upon something was because I had always stood upon something and was so used to the idea that I could not shake it.

And the instant it became an "idea" only, I fell. And I became scared. And I landed.

If I could only talk this over with someone, I sighed. But I was careful not to think I saw anyone, for people did not seem to like being hauled back from wherever they had gone. Certainly somewhere in all this there must be at least one other man. To think that I was the only one was conceit of the most outrageous kind. Somewhere there was somebody. And if he and I could just get together then he might know enough and I might know

enough to put some semblance of a world together and keep it together.

Again I wandered—and floundered—and fell when I thought about my solidity—and landed—and pawed through this endless mist.

Once or twice I thought I saw people. But I could not be sure, for I was careful not to think they *were* people. And when I had spent a timeless space in stumbling about I forgot my caution and, seeing a misty thing which looked like a man, thought he *was* a man.

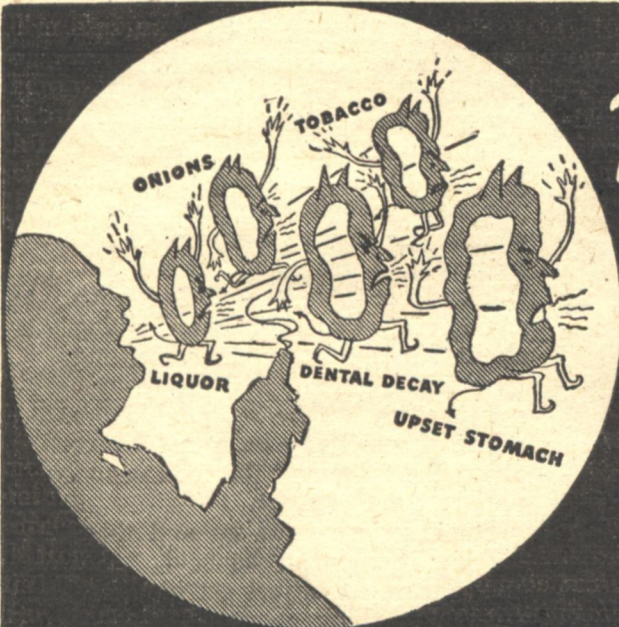
Very briefly he assumed a shape. It was nebulous and distorted as though I looked at him through a drinking glass just emptied of milk.

"Stop it!" he cried in a thin voice. "By what right have you dragged me back? Vanish and be saved!" And he vanished.

From somewhere came caroling voices and an ineffably sweet harmony which I could not associate with any instruments I had ever heard. For an instant there came over me an exquisite longing to forget myself and my misery and join that chorus. But then I remembered Flerry and George Smiley and, doggedly, I went on with my search. Half an eternity, it seemed, of toiling search.

It took me a long while to discover that other one. A long while. I felt I had swum through a light year of mist, had fallen through the bottom of the Universe and had scrambled skyward to the sun itself. But I found him.

He was a definite shape before I had any chance to think of him, and



*Bad Breath
Travels Far!*



Don't Offend... Use Sen-Sen

BREATH SWEETENER . . . DELIGHTFUL CONFECTION

when I thought him not there he still was there.

I had found him!

He was above me perhaps fifty feet and he seemed to be sitting on air and dangling his feet over the edge. Great gouts of mist rolled between us, blotting us from one another's sight. But each time the mist cleared, there we were again. I could not contain myself for joy and he seemed to feel much the same way, for he waved his arms down at me and beckoned me up. I beckoned him to come down. We must have been farther apart than it seemed to our eyes, for he could not hear me nor I him.

He was evidently frightened to let go of his perch in air and so I had to take the initiative. I looked along the way from me to him and thought hard about a stair. And step by step the stair appeared. I ran up it, shouting at him the while, but, in my enthusiasm, I forgot the stair and it vanished.

I landed as soon as I was frightened of earth's impact and again builded the stair. This time I looked at the steps as I went up and this time I arrived.

He was a diminutive fellow with a face which attested to a belligerent turn of mind. And his first greeting to me was, "Did you do all this?"

"No. George Smiley did it."

"Who?"

"George Smiley."

"Must have been an Earth man. I am from Carvon myself."

"Never heard of that," I said.

"Well, it *was* a nice place. I was researching on the regime of Vaso on Mwhmanin and all of a sudden my book vanished and here I was. And here I am."

"Here we both are," I said. "I've been looking all over for you. I

need help. Did you see those stairs I just built?"

"Yes, but they're gone now. It wasn't such a good job."

"Well, I've discovered that all we have to do is think of something real hard and then it will come about. And if we can remember it—"

"If we can remember it. I've been trying to concentrate on a ham sandwich for a day and a half, but I keep forgetting it before I can eat it. Woops. There it goes again."

"Now look," I said. "I'll think about it, too."

"No, let's get something to sit on first. I don't know what's under me and I don't—"

"Don't say that!" said I, barely saving him from falling. "All right, we'll think of a table. There! There's a table. Now you keep thinking about that table while I get a couple of chairs—"

He shut his eyes and kept a grip on the table. I shut mine and imagined us sitting on chairs. And then there we were, sitting on chairs—

"It's gone!" he said. And sure enough, the table was gone again. We had thought too hard about chairs. Finally we managed to feel natural and remember chairs and think of the table, too, and so, with some relief, we alternated thinking about things until we had something to eat and drink. But the trouble was that each time we would take a bite of something we would forget about the table and the food would plummet out of sight.

Somehow we filled up and then, looking thoughtful, he said, "You know, if we could just get practiced enough to think about all sorts of things, you and I, we could build the world back just about the way we want it. But the first thing we've got to do is to put the sun in the sky. I'm sick of this murk!"

"All right," said I, "I'll think about the sun."

And the sun shone brightly down. I must have been fairly well in practice, for I kept on talking and kept the sun up there at the same time.

"Now you think of earth," I said.

He thought about earth and a sort of uneasy motion was set up under us and flashy bits of scenery popped into view and vanished and popped up again. Chinese tombs and a far off domed city and a ferryboat on a lake all appeared and disappeared.

"It's not much use," he said. "It just can't be done all at once. Let's imagine one town and then, when we get used to that and believe in it, we'll imagine the fields around it—"

"All right. But we really ought to imagine something to build the town on. A great globe in the sky, twenty-five thousand miles in circumference—"

"Let's be different," he said suddenly. "As long as you and I can do this all by ourselves, we'll just put this together on some new principles. There's no use copying what we've already had. Now how about living inside the earth—" He stopped in awe. "Why, we—"

I cried, "Why . . . why, we're—"

"Yes," he said, "yes, we're—"

"OH, NO, gentlemen," said a silkily sardonic voice. "And we both whipped around to find George Smiley standing there in his flashtex cape. "If there is anything to be built, then I shall build it. You two are the most stubborn of all, but you've agreed with each other. And now you can agree with me.

"I worked for years to sell the world the idea of nonexistence. And if anyone intends to build a world then it shall be me. Who put that

sun in my sky?" And he waved his hand toward it and the sun went out.

"We've got a perfect right," said my friend.

"No, you have not," grinned George Smiley. "I faded all things into nothingness, even Time for myself. And because I made the whole world believe and all the Universe, then the Universe is mine. And I shall build."

"Why, you're trying to set yourself up as—"

"Yes," said George Smiley to my friend. "Yes, indeed."

"We have just as much right!" howled my friend.

"I shall then give you half of it," said George Smiley. "The lower, hotter half. I shall create a world for you alone to rule."

"No!" protested my friend.

"Yes," said George Smiley. "It's a quaint idea I got out of an old book. Now begone, both of you!"

And suddenly we were falling again. But this time no matter how much ground I thought about no ground was there to stay me. My friend was soon separated from me and he did not see the water which suddenly spread below me. I know he did not, for he was still falling when last I saw him.

As for myself I climbed out on a muddy bank of the Seine and wrung the water out of my clothes.

The United States Marines didn't even ask me any questions when they locked me in their jail as a possible enemy airman.

And I didn't volunteer any answers.

I was too glad not to have to think about that bunk before I stretched out upon it.

George Smiley can have the Universe for all I'll ever care.

THE SEARCH FOR ZERO

By Willy Ley

Second and concluding part of an article on the difficulty of finding where to begin. All civilizations the world has known had the same natural facts to work with; ours is the first to find a way to get order out of chaos!

Illustrated by Willy Ley

CHEMISTRY failed to progress more quickly as I pointed out in the preceding article, for more than just one reason. It did not suffer from a lack of general conceptions; there were quite a number of ideas in vogue at various times. Unfortunately these ideas, while interesting, weren't true.

Another handicap, the one that is most conspicuous in retrospect and could have been remedied most easily, was the looseness of terms and the cumbersome and intentionally mystifying language. One of the last alchemists, Kunckel von Lowenstern—incidentally the inventor of ruby glass—complained bitterly about this in saying: "The sulphur of one is not the sulphur of another, to the great injury of science. To that they reply that everyone is perfectly free to baptize his infant as he pleases. Granted. You may, if you like, call an ass an ox, but you will never make anyone believe that your ox is an ass."

It has to be added that this "sulphur" hardly ever meant element No. 16—how nice and reliable such a term is; it doesn't even need translation from one language into another!—it was again a "principle" just like the four Aristotelian principles of fire, water, air and earth, or heat, cold, wetness and dryness in combinations of two. Using modern

expressions, one might say that "earth" had been divided into three "sub principles" by somebody who had called them "sulphur," "salt" and "mercury." These names stood for combustibility, incombustibility, and metallic appearance. It is uncertain who originated this, but the one who shouted that theory into the world was the well-known "Ermite from Hohenheim," Dr. Paracelsus. Every solid, he taught, was a mixture of these three principles. Sometimes that mixture was perfect, then you had perfect, durable, and, in the case of living beings, healthy things. Sometimes the mixture was less perfect, then things were unstable, perishable, ill. To improve imperfect mixtures the lacking principle had to be added.

The four Aristotelian principles as well as these three sub principles belonged in the category of those ideas chemistry had to discard as quickly as possible. As philosophic thoughts they were not so bad—at any event, there were philosophic ideas that were worse—but they could not advance science because they did not comply with the facts.

Another idea that caused tremendous confusion and blocked the progress of chemistry for quite some time was that of a metal's "soul." That "theory" said, in effect, that all

metals are the same matter, equipped only with different tinctorial spirits, one of the fundamentals of alchemistic thought. In accordance with that conception, alchemists were hunting for a metal body without a soul. Their suspicions finally centered on mercury. It was evidently a metal, but it was not a solid. Some thought that it was not a solid because it lacked a soul. Others contended that it did not lack a soul completely, only it was not a "metal soul." Instead of a metal soul, it was inhabited by a "basilisk" that could possibly be driven out and a metal soul put into its place.

To drive out the "basilisk," heat was applied—which resulted in the nickname of "toadburners" for alchemists—and a successful exorcism was expected to result in silver. Now, the argument ran, if the metal could be tinged simultaneously with the establishment of a metal soul, the result would be gold. And generation after generation of experimenters labored to harden mercury by boiling, to tinge it by adding sulphur and yellow oil. But it was dangerous; the basilisk bit those experimenters, and they came down with terrible headaches and all the other symptoms of mercury poisoning. Thus they added other things—for example, lead, to provide a new home for the basilisk—or they added substances supposed to kill the basilisk.

Legend claims that the inventor of gunpowder actually tried to make gold by mixing mercury, lead, oil, sulphur and the then-new saltpeter in one pot. It exploded promptly. That legend is credible, especially if we consider that gunpowder was already known to the Arabs, so that the monk, after recovering from shock and injury, could easily deduce what he had really done.

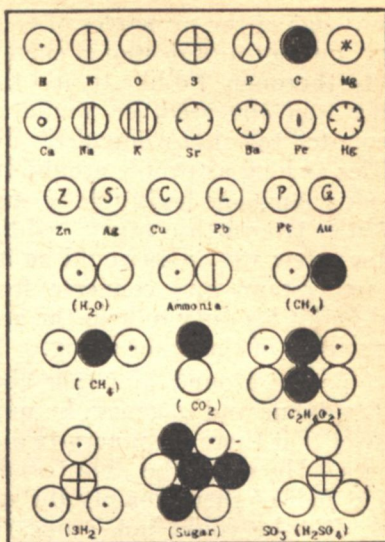


Fig. 1. The chemical symbols originally proposed by Dalton, with circles representing projections of the assumed spherical shape of the atoms. Compounds are represented as Dalton believed them, with modern symbols beneath. Water, Dalton thought to be simply HO, for instance.

Most of these wrong theoretical abstractions were due, of course, to the fact that the true elements and the laws governing chemical combinations are so well hidden. Even those elements that occur in almost pure state and in sufficient quantities and abundance to be noticed do not carry a sign around that tells the observer that they are elements. Chemical elements as well as chemical reactions are veiled with the camouflage of deceptive eye evidence.

How difficult it was to penetrate through that camouflage and to find the facts behind it is best realized if we imagine that a man from our time were mysteriously transported backward through time for a period of exactly four centuries. We shall assume that he is a well-educated and well-read man, with a normal

knowledge of the principles of chemistry, but not a professional chemist. To be thorough, I'd like to add that, being well educated, he would not encounter too many linguistic difficulties as long as people around him speak a language he is able to speak in its twentieth-century edition. After a few weeks he would be able to understand and converse freely and find it his duty to help the groping science of that time along.

If people around him talk about salt, sulphur and mercury, he might answer that there are ninety-two elements. He would be able to name about half of them, mainly the metals. But he could not *prove* that the metals are elements, because that proof requires the greater part of the system of inorganic chemistry. How could he prove that water is a compound of two gases, having no electricity with which to decompose it? He might be able to isolate nitrogen, but that inactive gas would not be good for many demonstrations. He could not crystallize lamp black into diamonds to show that they are the same. He could not pry silicon dioxide apart—and all this in spite of his knowledge that things are as he claims them to be!

What could be expected of the people four centuries ago that did not have that knowledge? They tried to harden mercury by heating it; the man from 1940 could tell them that they had to cool it if they wanted solid mercury, which, of course, would not do them any good. But he could not even prove that. The melting point of mercury—oh, yes, he would have to teach them about melting and boiling points first, a task in which he might succeed—is forty degrees below zero. You can pick your choice between the Fahrenheit and the centigrade

scale, because that's where they meet, accidentally—not because of mercury. But when Gabriel Fahrenheit, only two hundred years ago, established his "zero," he used a mixture of salt and sea water in winter—the coldest thing he could produce. It does not get cold enough in Europe, not even north of the Alps, to freeze mercury.

If an alchemist told him that he was seeking the *prima materia*—the original substance that forms all others—the man from 1940 would already be wise enough not to say that it is energy and try to discuss neutrons, ions, positrons, electrons and other subatomic building stones. It would not simplify matters in the eyes of the people of 1540, and that is what the discovery of a natural law is supposed to do.

Somebody may hand him a copy of the book "*De la Piròtechnia*" by the Italian Vanoccio Biringuccio, which was printed in that year. In defense of the four Aristotelian elements, he would be shown the chapter on gunpowder, the explosion of which Biringuccio beautifully explained in telling that "earth" was changed through "fire" into "air." "One part of fire," he would read, "takes up as much space as ten parts of air, and one part of air takes up the space of ten parts of water, and one part of water as much as ten parts of earth. Now powder is earth, consisting of the four elementary principles, and when the sulphur conducts the fire into the driest part of the powder, fire and air increase—the other elements also gird themselves for battle with each other, and the rage of battle is changed by their heat and moisture into a strong wind—"

Should he answer that the salt-peter in the powder gives off oxygen

which combines with the sulphur and the carbon of the charcoal, and that most of these compounds happen to be gases that under normal air pressure and temperature would occupy two hundred eighty-five times the volume of the powder, but that the reactions produce heat which makes the gases expand so that they occupy about three thousand two hundred times as much space as the unexploded powder? He would have difficulty in proving any part of his argument, and even then he might be told that he merely expressed in a dry and vague manner what Birin-guccio had told in a more dramatic style.

At that time the experiment of burning a candle under water in an inverted beaker was already known. In fact, it was an old experiment. Magister Salernus had described it as early as 1150 A. D. He had explained the rising of the water in the inverted beaker in calling the air "nutrimentum"—food—for the flame so that it was partly consumed and empty space came into being. But Nature had a *horror vacui*, and therefore could not permit the space to remain empty. Thus the water rose and occupied it. Three hundred years after Magister Salernus, his explanation had been amended and "bettered." No air was consumed, you see, my learned friend. If air were *nutrimentum* for the fire, it would all be consumed. It is only that the fire makes the air become thicker with smoke, consequently the water has to rise!

REVIEWING these ideas and arguments, one cannot help but feel that it is little short of a miracle that chemistry *did* manage to thread its way out of that jungle of perfectly obvious and natural misunderstandings. We know now that the solu-

tion consisted in finding the units of chemical occurrences, i. e., the elements, and in distinguishing compounds and elements and in discovering what elements produce what compounds. In modern terms: how many atoms join to form a molecule.

All that had to happen slowly and step by step. Realization of the true connections had to dawn naturally. Lectures on modern twentieth-century chemistry would not have helped. To show a medieval alchemist around in a modern chemical plant and explain the manufacture of nylon and its principles to him would be like dragging a man who can barely carry the tune of the national anthem into Carnegie Hall and making him listen to a beautiful program, consisting of César Frank's symphonic variations for piano and orchestra, Bach's "First Brandenburg Concerto," Smetana's "Moldau," Wagner's "Fire Magic," and Beethoven's "Fifth Symphony" and telling him at the end of the concert—if he is still alive—"That, my dear sir, was *real* music."

To understand and appreciate good music, the poor man would have to be trained slowly. He would have to learn the basic conceptions of rhythm and of harmony first, he would have to learn what instruments exist, their main distinctions and, at least in approximations, their range and qualities. Then he would not confuse the possibilities of the bassoon with that of the flute, and would not try to play a melody on the kettledrums. This sounds silly only to those who know better; to people who do not know bassoons and kettledrums and "bull fiddles," it would just not make sense at all. Reverse the assumptions and you know why the errors and the conclusions of the alchemists sound so

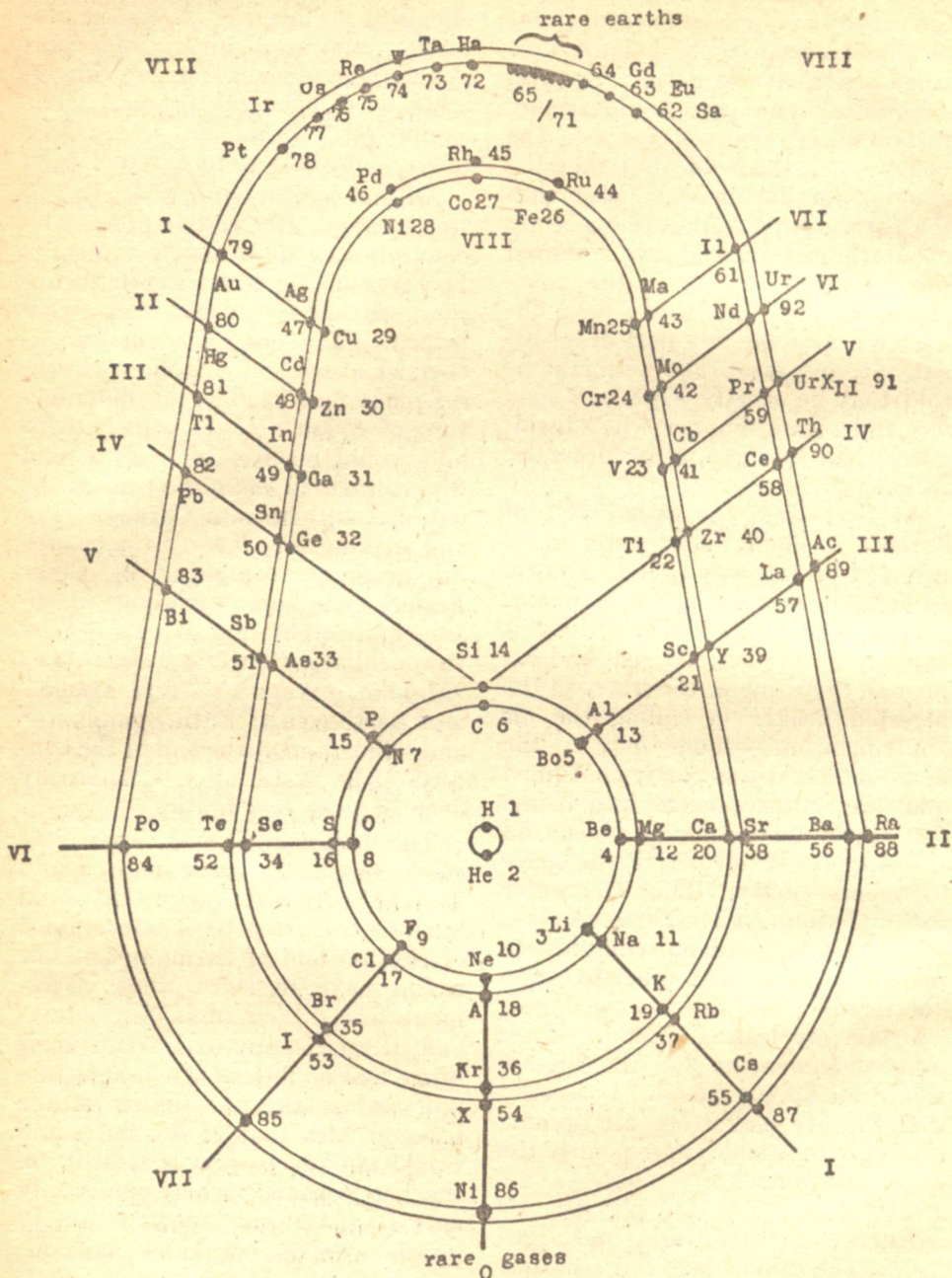


Fig. 2. One of the many less-usual but useful arrangements of the periodic table. Special forms of the table can be arranged to show gradations of various specific properties. This one is based on arrangement of electrons in the valence rings of the atom.

strange and humorous to practically everybody of our time. They did try to get high-pitched screams from a tuba and harmonies from kettle-drums. And they labored under the delusion that more ingredients increased the chances, just as primitive tribes usually accept noise as music and more noise as better music.

The alchemist, in order to become a chemist, had to learn how to play simple melodies first and to play them right. He had to learn how to make simple experiments that really taught something, because one reaction at a time took place. He also had to learn to experiment for no other reason and to no other purpose than the increase of knowledge, not to look for a certain reaction and disregard the failures—remembering them only as failures—but to look at every experiment as an object lesson.

To the true chemist, something was taught by each and every experiment, because even "failures" are often valuable experience. A man from the year 1940 might have told him: Forget everything you ever learned or read. Regard all existing ideas as nonsense, based on mistakes. Start all over again and trust only your own judgment. In short, invent what we call "pure research."

The psychological condition needed to arrive at some such conclusion without being taught was a certain kind of clear-headed and colossal conceit. It involved the primary assumption that every writer who had gone before was a complete blockhead, liar, or fool—which was wrong—and that every statement of the earlier workers was totally unreliable—which was close enough to the truth to be a good foundation. That sort of attitude makes for two things: a discovery of facts, and an immense unpopularity among all other learned men.

It was necessary to give up those persistent hazy ideas about lost arts* and to say "We can do better." Fortunately quite a number of men in different fields began to think that way. In astronomy it was Copernicus; in physics it was Galilei; in philosophy it was Cartesius—Descartes—who stated clearly that, since prejudices are often mistaken for considered opinions, even if that danger is known and realized, there exists only the one remedy—to doubt everything.

Science and philosophy were very much the same then, and even those who were more on the scientific side felt the need for, or at least welcomed, such philosophic support. In chemistry, that new era of universal doubt was inaugurated by the seventh son of the Earl of Cork, the Honorable Robert Boyle, who titled his book, without the slightest sign of an apology, "The Sceptical Chymist." "I am wont to judge opinions like coins," he said about himself, and advised others to do likewise—not to care what the inscription on that coin says, or whose picture it shows, who used it last and through how many hands it passed before, but looking only whether the metal is good and how much it weighs.

When people begin to doubt the value of current coins, it usually does not take long until new coins are minted. Boyle himself was responsible for a few that soon proved their value. It was realized that compounds and mixtures were not the same; it was suggested that there existed a number of real elements, not only the primal matter of the alchemists, attired in different "qualities" and "principles."

* The only truthful example of a temporarily lost art I know is the secret of Kunckel's ruby glass, which was lost for about two centuries; it consisted in dissolving some gold in liquid glass.

AND THEN attention began to center upon combustion. The "fire" of Aristotle or the "sulphur" of Paracelsus seemed to be present in almost every compound. And "air" was also always present; in fact, it seemed necessary for the existence of fire. Chemistry was then on the verge of discovering oxygen, but knowing only that it had to go somewhere, without knowing the exact goal, it took a wrong turn. Before oxygen was discovered, another theory was evolved, a theory much more ingenious than the actual facts. Although it was entirely wrong, it worked; in fact, one could predict the outcome of experiments with the help of this theory and see the predictions come true. It was the closest thing to an "arbitrary zero" chemistry ever attained, and its name was "*Phlogiston*."

It is almost customary nowadays to treat the phlogiston theory with contempt, and to say that chemistry did not begin, could not begin, as long as such a superstitious thought prevailed. Such judgment is not just; it is like saying that navigation did not exist before the invention of the marine chronometer. The phlogiston theory was wrong, but it was helpful because it simplified matters considerably. The father of the phlogiston theory, Georg Ernst Stahl, conceived it as the principle of combustion in the form of a chemical element. There was no "principle" of combustion, the thought ran, but one, and only one, combustible element which received the name of phlogiston. Now a substance that was combustible necessarily contained phlogiston. In a pure form, that element did not exist—at any event it could not be found—but there were some substances that were very rich in phlogiston. Soot was almost pure phlogiston; charcoal con-

sisted of at least three quarters of phlogiston.

It would not be right to think, however, that phlogiston was just another name for carbon. It was something else. If you had sulphuric acid and added phlogiston, the result was sulphur. Rust plus phlogiston gave iron, and the "calx" of any metal—*calx* is originally the Latin word for lime, and it was applied to what we now call metal oxides—combined with phlogiston gave the metal. The proof was in heating the calx with charcoal, the compound richest in phlogiston that could be had in quantities.

Some could not be restored; they were those where even the last traces of phlogiston had been removed during the process of calcination—the old thought of the completely soulless metal body appeared here again. All this could be proven experimentally, it worked beautifully. It was probable, furthermore, that we exhaled phlogiston constantly—obviously the chemical reason for aging. Now about the candle in the inverted beaker; it evidently needed air to burn and went out after some time. That happened when the air was saturated with phlogiston, air was needed for combustion because it was needed to absorb the phlogiston. Pen and ink alone cannot write—one also needs something to write on.

Some substances contained more phlogiston than others, of course. If you put iron into a solution of blue vitriol, copper began to appear. It had been dephlogisticated before, but had taken phlogiston from the iron which, as was known, was a compound of rust and phlogiston. Now when you drove the phlogiston from metals, calcinating them, they gained in weight. The reason for that was that phlogiston, the only combustible element, differed from all others

also in another very important respect, it was the only element with negative weight or *levity*. With the buoyant part removed, the "metal body"—to use that old term once more—had to be heavier.

It was a fascinating mistake. It was one of the very first general principles in chemistry. It explained so very many things. And it at last suggested law and order! It explained, for example, why some metals are heavier than others. Specific gravity was known since the oldest times, even the term itself is older than the Christian Era, but nobody had ever been able to say why gold was heavier than lead and lead heavier than tin. Those metals contained different proportions of phlogiston. Simple.

Only it did not work always. Charcoal was mainly phlogiston; charcoal ash, therefore, should be extremely heavy after all the phlogiston, which made it so light, had been driven out. But charcoal ash was very light. And not all the metal "calxes" were heavier than the metals. The phlogiston theory would still rule supreme—and we would have a very strange chemistry—if carbon dioxide were not a gas but a solid, like silicon dioxide. Because then charcoal ash plus the solid, heavy carbon dioxide would have been considerably heavier than unburned charcoal, and the assertion that ash plus much phlogiston were the constituents of charcoal would have been almost unshakable. It was necessary to discover the gaseous elements of the atmosphere before the solid elements could be isolated or, like the metals, recognized as elements.

For that reason, the discovery of oxygen was the real turning point in the history of chemistry. The discovery of oxygen meant the over-

throw of the phlogiston theory which, after having served its purpose of simplification, frustrated further progress in asserting that metals were not elements. A few gases were sketchily known around the middle of the eighteenth century; they were known somewhat as Antarctica was known in 1900. There was something that still needed exploration. There was Cavendish's "inflammable air from metals"—hydrogen. There was Dr. Black's "mephitic air" that was absorbed by caustic potash— CO_2 . There was Rutherford's "noxious air," which was like "mephitic air" but was not absorbed by caustic potash—nitrogen. And then there was "completely dephlogisticated air," which was, therefore, very ready to absorb phlogiston and made substances burn rapidly and brightly. That was oxygen, of course, and Joseph Priestley isolated it on August 1, 1774. Carl Wilhelm Scheele—pronounced Shaylay—had done the same three years earlier.

THE TIME was then ripe for another chemical revolution, another radical reevaluation of current coins. The new ideas found their expression in the writings of a Frenchman, Antoine-Laurent Lavoisier. There is a dreadful sentence connected with that name, a sentence that makes scientists, in general, very doubtful of the value of politicians, because it was spoken by a politician. The sentence: "*La République n'a pas besoin des savants!*" That was Lavoisier's death sentence; a few days later he was guillotined because he was an "aristocrat." He was a brilliant chemist, he had done invaluable service to science, he had not violated any laws. But the Reign of Terror sentenced him to "embrace Madame la Guillotine." He pleaded for permission to go back to his work

and his books, he pleaded for at least a few weeks to finish certain researches. And he received the reply: "*La République n'a pas besoin des savants!*" (The Republic does not need scientists!)

During that political evolution the chemical revolution took place that opened the path to the discovery of the actual elements. Those terms like "basilisk" were thrown out and the rigid Latin classification of the biologists was adopted. And oxygen was substituted for phlogiston and the whole picture of combustion reversed. That chemical revolution had many of the humorous trimmings that often accompany tragedies. In Berlin, outraged Stahlists burned Lavoisier's picture, then they quickly decided that metals were nice elements and that phlogiston was not needed. And many of the spiritual fathers of the revolution went rigorously on strike. All those that were older than Lavoisier decided that *they*, at least, would have nothing to do with those newfangled ideas—not so soon, anyway. The discoverers of oxygen happened to be the most stubborn strikers! But the thought that the "calx" was the compound and not the metal began to show results. Molybdenum was discovered and tellurium, chromium and beryllium, palladium and rhodium, osmium and iridium. Sir Humphrey Davy alone discovered and isolated potassium, sodium, barium, strontium, calcium, magnesium and boron and finally chlorine.

Before that revolution took place, about fifteen elements were known, but not recognized as elements. The immediate consequence of discarding phlogiston was the recognition of these elements and the discovery of about twenty others.

Then the attack faltered, a few tactical mistakes had been made that

needed rectification. There were two "compounds" that could not be decomposed. One was nitrogen, the other was chlorine. As regards nitrogen, it was a simple mistake, but the attack on chlorine was the outcome of a perfectly logical chain of reasoning.

Several chemists—Scheele was one of them—had studied what we now call chlorine compounds and had found that a solution of a certain substance—a yellow-green gas—in water slowly decomposed in sunlight, producing muriatic acid and liberating oxygen. Since it was accepted as a fact that acids were oxygen compounds*—a stuff that produced an acid *and* oxygen had to be a high oxide. It must be "oxygenated muriatic acid," and would be found to consist of oxygen and *marium* if somebody succeeded in decomposing it. What they tried to decompose was chlorine gas, and try as you might, you could not tear this "high oxide" apart. It would have been atom cracking if somebody had succeeded. Fortunately, electrical engineering had not progressed to cyclotrons yet, and chemistry was spared additional confusion. Chlorine was recognized as an element, after much hesitation. It meant giving up the theory that an acid must contain oxygen.

Another much embattled riddle of that time was the question whether a solution is a compound or not. Mixtures and compounds were not the same, but how about a solution? That question was of much greater importance than can be realized at first glance. If a solution was a com-

* The very name of "oxygen" is "acid former" just as that of hydrogen is "water former." Both are historical mistakes that cannot be changed anymore, but it would be better if hydrogen were called oxygen and vice versa. The main constituent of water, by weight, is oxygen, and, while there are oxygen free acids, there exists none without hydrogen.

pound, any element could combine with any other element with which it combined at all in almost any proportion. You can dissolve one teaspoonful of salt in a gallon of water, or three or six or ten. There is an upper limit, but no lower limit. That would mean that oxygen and hydrogen, for example, could form innumerable kinds of water. That contention smacked of alchemistic times and of Paracelsus, who had said that there are many kinds of gold just as there are many kinds of apples. Such a world would be chaotic, a fact realized only by those that claimed that solutions are not compounds, and that chemical elements can combine with each other only in a limited small number of ways, or, as it was expressed, in definite and multiple proportions.

With the acceptance of this law, chemistry progressed another big step. Of course, one is tempted to say, it caused another temporary error. Air was always found to consist of a certain proportion of oxygen and nitrogen. Was air a compound of these two gases? Samples from high altitudes, attained in dangerous flight in open gondolas of free balloons finally made chemists decide that air was a mixture.

THE INTRODUCTION of rigid nomenclature permitted the sensible revival of a practice the alchemists had abused: the use of symbols. Symbols, if agreed upon by everybody, have all the advantages of shorthand and a few more: they take less time to write, save space, can be read quickly and can even be used for graphic descriptions. The Swedish chemist Torbern Bergman had suggested a plus sign for "acid," a circle for "salt," and others. That was in 1783. Later, the mining inspector Hassenfratz and the physician,

Adet, published a book about "New Symbols to be used in Chemistry"—"*Neue in der Chemie anzuwendende Zeichen*"—in which they proposed to use the first letter, or letters, of the Latin name of the element. For example: A for silver; As for arsenic. If that substance was a metal, the letter was to be placed in a circle, if it was combustible, in a half circle. And to show whether it was normally solid, or liquid, or gaseous, short lines after the usage of written music were proposed; no line for solid, upward line for liquids, and downward line for gases. The present system of chemical symbols is evidently that of Hassenfratz and Adet, as it was finally introduced by Baron Jöns Jacob Berzelius—without the symbolic frames, because a chemist does not need them to know that H is a gas and combustible.

But there existed another set of symbols, invented by John Dalton. They were all circles, circles with simple geometrical designs for abundant elements and circles with the first letter of the English name for the others. Dalton's circles, however, were not just circles; they were intended as pictures, two-dimensional projections of small spheres—the atoms.

The modern conception of atoms originated, strangely enough, from observations of rainfall. Rain fell, and evaporated again. Probably there was always some water vapor in the air; sometimes more; then again less. Now if air were a homogenous mass of some kind, the vapor could not get in. Therefore the various "kinds of air," water vapor, water itself and indeed every substance had to consist of small discreet particles. That thought was not entirely new; the Greek Demokritos had already spoken about small, indivisible—"atomos"—particles. The re-

vival of atoms was quietly disregarded for some time; the question whether a solution was a compound had to be decided first. As soon as it was, chemists began to say "atoms" where they had said "proportions," and the atomic theory gained the upper hand.

All the time the discovery of other elements progressed rapidly. Berzelius alone isolated selenium, silicon, zirconium and titanium. Iodine, lithium and cadmium were found by various researchers. Oersted started and Wöhler finished the discovery of aluminum. One year later, 1828, Wöhler found beryllium and achieved his crowning triumph; he synthesized urea, proving that the wall between "organic" and "inorganic" chemistry was artificial. One might also say that he exposed a fictitious "element"—the "Life Force" supposed to operate in building up organic compounds—even though it had been admitted that the elements of organic compounds were the same as those of inorganic compounds. Later, during the same century, another "imponderable element" was exposed, heat, which was found to consist simply of molecular motion.

Most of the fundamental work had been done when Wöhler synthesized uric acid. Of the ninety-two elements, fifty-five were known, atoms were recognized as the smallest units, and many properties of molecular structure known. Only a few more fundamental questions had to be answered. One of them concerned the number of elements. Was it limited or not? Would other elements be found on other worlds if they could be visited? Then there were a few questions of molecular structure to be investigated. How many joints were there in the molecule of carbon compounds, for example? The arrangement of these atoms seemed to

obey certain rules, but could not be understood.

All these questions found answers during the ten years from 1859 to 1869. Or, if you want to be particular, during these ten years the principles for answering them were found. In 1859 Kirchhoff and Bunsen developed the spectroscope, based on the strange lines observed earlier by Fraunhofer and named after him. That spectroscope permitted analyzing the light from other stars, and while it was found that there were elements missing elsewhere—or did not show their lines for various reasons—there was none that were non-existent on Earth. Helium, as is well known, was found in the light of the Sun before it was discovered on Earth. But it existed here, too. At the same time, the spectroscope helped to discover still unknown elements in earthly minerals. In fact, most of the thirty-odd elements still unknown when the spectroscope was invented were found by its application. Kirchhoff and Bunsen themselves found cesium and rubidium with their new instrument. Sir William Crookes and C. A. Lamy found thallium, and in 1863 F. Reich and H. H. Richter discovered indium.*

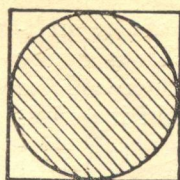
* The reader may well wonder why certain elements escaped discovery for so long and what elements were hardest to find. Now discovery and isolation are not the same. The discovery may be spectrographic, while the isolation is a story all by itself. But in general it can be said that it was not great rarity that permitted some elements to hide for a long time, but similarity to others. Argon, for example, although constituting one percent of the atmosphere, was found late—1894 by Raleigh and Ramsay—because it is similar to nitrogen in many respects and chemically inert. The other rare gases are also inactive and rare besides. And the "rare Earth" elements, while not inert, are rare and very similar. Originally the whole rare Earth group was believed to be one element, the oxide of which was called "yttria." The slow unfolding of this group "which haunts us in our very dreams," as a famous chemist put it, gave rise to Charles Baskerville's ironical remarks at the St. Louis Meeting of the American Association for the Advancement of Science in December, 1903, where he said: "for yttrium begat cerium, and cerium begat lanthanum, and lanthanum begat samarium and didymium, and didymium begat neo-didymium and praseo-didymium and praseo-didymium begat alpha and beta praseo-didymium 'und so weiter.'"

And in 1869 two chemists announced that they had found rhyme and reason in the number of elements and their properties, that they had found that the number of elements was limited and that those still missing could be predicted and most of their properties besides! Chemistry had learned to count—it could predict things and afterward verify the prediction!

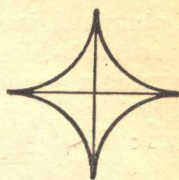
The names of these two men were Dmitri Ivanovitch Mendeleeyff and Lothar Meyer. As it happens so surprisingly often in the history of science, both made their discovery not only independently, but at about the same time. Their methods were also very similar. They had arranged the then-known elements in tables, had arranged them by atomic weight and atomic volume, had arranged them by properties, and drawn innumerable curves until they found periodicities. The result was what is known as the Periodic System.

DMITRI MENDELEYEFF, in his book, "Principles of Chemistry"—one of those books where seventy-five out of every hundred words are footnotes—had predicted "Eka-aluminum" (aluminum's neighbor) which was found by Lecoq de Boisbaudran and named Gallium. The following is a condensation of Mendeleeyff's prediction, with added actual facts: Atomic weight about 68 (69.7); a metal of specific gravity 5.9 (5.94); nonvolatile, unaffected by air, dissolving slowly in acids and alkalis, low melting point (30.15 degrees C). Will be discovered by spectroscope. Its oxide, according to the formula Ea_2O_3 , should dissolve in acids to form salts of the type EaX_3 , and the hydroxide should dissolve in acids and alkalis.

Every point was correct. Mendeleeyff's Ekaboron turned out to be



78 $\frac{1}{2}$ %



21 $\frac{1}{2}$ %

Fig. 3. The mystics we have always with us. As late as 1846 this diagram appeared in a technical journal of good repute as a "reason" why the proportions of nitrogen and oxygen in air were 78½% to 21½%. The theory was slightly cracked when it was discovered that there is also about 1% of rare gases in air.

scandium, practically every single fact predicted was found to be true, the largest difference being that of specific weight of the oxide, which is 3.86 and was predicted to be 3.5.

Another prediction concerned Ekasilicon, now known as germanium. Follows a short list of predicted and actual properties, the latter in parentheses. Atomic weight: 72 (72.60); specific gravity: 5.5 (5.47); atomic volume: 13 (13.22); valence: 4 (4); specific heat: 0.073 (0.076); specific gravity of dioxide: 4.7 (4.703); molecular volume of dioxide: 22 (22.16).

Chemistry did not know what to expect. In being able to predict unknown units from the behavior of known units it proved that it had reached maturity.

And at about the same time, August Kekulé made an equally important discovery, important as well for theoretical understanding as for industrial application.

Benzene was known to have the formula C_6H_6 —but nobody had any intelligent conception of how these atoms were connected in the molecule. Neither had August Kekulé, in spite of deep and prolonged thinking about those mysterious linkages

of atoms. His solution of the problem came to him, incredible as it may seem, in a dream. He often told the story himself, and he told it as follows :

"During my stay in Ghent, Belgium, I lived in a fine room on the main street. I sat in this room and wrote on my textbook. It did not go well. I turned my chair to the fireplace and fell half asleep. The atoms again played antics before mine eyes—long rows united—and one of the snakes seized his own tail. I awoke as by a flash of lightning—and spent the remainder of the night working out the consequence of the hypothesis."

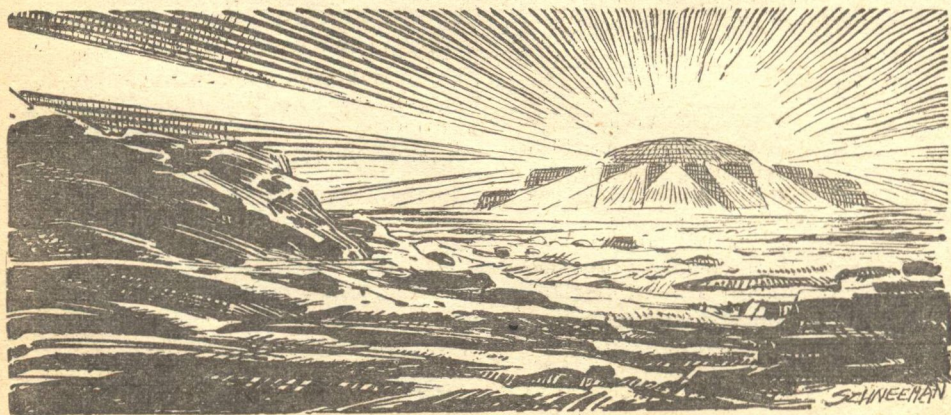
Psychologists will probably explain the dream in saying that Kekulé had the hypothesis, that molecules may be ringlike structures, in mind for a long time, but that his consciousness did not permit the thought to penetrate to the surface. Thus it needed a time when the inhibitions of conscious thought were eliminated by sleepiness so that the subconscious could work unrestricted. But whatever the psychological explanation may be, the "consequences of the hypothesis" were enormous. Kekulé's "benzene ring" made intelligent research possible,

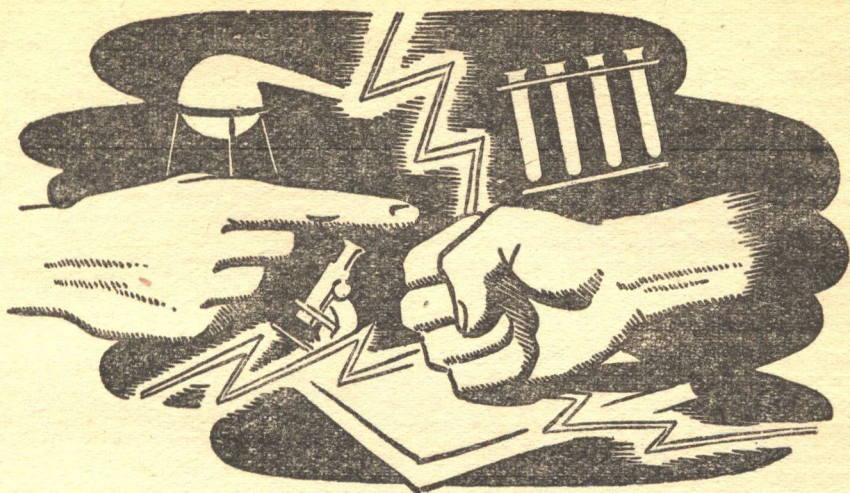
it was as important—if not more so—than the Periodic System.

The benzene ring is a beautiful "zero," a magnificent starting point. It transformed the chemist into the "molecular engineer." "He sits down at his desk and draws a Kekulé ring, or rather, hexagon. Then he rubs out an H and hooks a nitro group—NO₂—on to the carbon in place of it; next he rubs out the O₂ of the nitro group and puts in H₂; then he hitches on such other elements, or carbon chains and rings, as he likes. And when he gets a picture of the proposed compound to suit him, he goes into the laboratory to make it." (Quotation from Dr. E. E. Slosson's "Creative Chemistry.")

Spectroscope, Periodic System and Kekulé ring do not conclude the story of chemistry. They were just another beginning, as the discovery of the constancy of boiling points was another beginning. There never is such a thing as an end. When the phlogiston theory was overthrown, it was the end of that theory, to be sure. But it meant that metals were elements. And then chemists began to understand what they were doing.

THE END.





BRASS TACKS

But the greatest work men can do is to fight and conquer environment.

Dear Mr. Campbell:

"The Stars Look Down" is the top story for August. Also, I think that, by a rather small margin, it tops "Coventry" and "The Roads Must Roll," both of which I considered very fine novelettes. My English Lit. instructor—a good many years ago, I assure you!—said that good stories, but not real literature, could be written around man's struggle with his environment; that better literature could be written about man's struggle with man; but that truly great literature invariably dealt with man's struggle with himself. Like most instructors, he cited Conrad's "Lord Jim" as the finest, or at least, most typical, example of this.

Now, obviously, science-fiction is going to involve the two lower classifications; but stories like "The Stars Look Down," "Coventry," "The Roads Must Roll," and "Final Blackout" go beyond these. I'm not saying that these stories are in the same class as Conrad's immortal novel—that would be rather silly—but I do say that these stories have literary value, and the reader does not, necessarily, have to be a science-fiction fan to enjoy them. "The Stars Look Down" is the story of two men and a dream; a dream which could be attained only in science-fiction; but the struggle for attainment is a real and human one.

"Vault of the Beast" gets second place

this month. I started to read this without noticing the author's name; but, before I had gone far, I knew it must be by van Vogt. It is reminiscent of his first two novelettes in *Astounding*, both of which rated high with me.

"Crisis in Utopia" is a very strong third. I enjoyed this very "astounding" tale from beginning to end. "Done Without Eagles" perhaps rates fourth, with the rest following closely, in any order you like. I liked them all.

De Camp seems to be a pretty capable "whitherer." I can see that this article is going to affect my reading of non-fiction almost as much as his "Language For Time Travelers" did—and that was quite a stimulus.

Seems to me that, if the first really successful set-up using the uranium fission reaction is built along the lines suggested by McCann, it will be more than three years in arriving. But I am quite sure that it *will* arrive, either in that form or some other.

The spaceship cover rates right along with the astronomical covers. It is a beauty! Good inside illustrations are those of Cartier and W. A. Koll.

That difficulty involved in the ratings in the Analytical Laboratory could be very neatly taken care of by means of a special rating form for the entire year, printed in the December number, and published in an early issue of 1941, showing the "best of the year" among all stories, and, in sepa-

rate ratings, the most popular novels, novellettes, and shorts. Of course, you might not get the five hundred or more responses necessary to form an accurate estimate; but I think you would, if you would mention it in preceding issues.—D B. Thompson, 3136 Q Street, Lincoln, Nebraska.

The Barrier, if electric in nature, would be shorted out, grounded, by water. This would permit passing it.

Dear Mr. Campbell:

Another letter appears due, so here goes. More roses first for "Final Blackout." One of the greatest stories I ever had the pleasure to read, it goes on my double-star list. Confidentially, Hubbard's tale far surpassed your Nova selection "If This Goes On" by Heinlein—at least according to my viewpoint. If Heinlein is due a nova, he should receive it for a short he published in '39, "Misfit," his best story to date.

While on the subject of a double-star list here goes: The following are the ten best stories Astounding has brought forth in the last six years:

1. "Legion of Space"—Jack Williamson '34
2. "Skylark of Valeron"—E. E. Smith '34—'35
3. "Bright Illusion"—C. L. Moore '35
4. "Mightiest Machine"—ye olde editor '34—'35
5. "Galactic Patrol"—E. E. Smith '37—'38
6. "Cosmic Engineers"—Simak '39
7. "The Cometeers"—Williamson '36
8. "The Far Way"—David R. Daniels '35
9. "Gray Lensman"—E. E. Smith '39—'40
10. "Final Blackout"—Hubbard '40

Runners-up (very close, too): "Parasite Planet"—Weinbaum; "Dead Knowledge"—Don A. Stuart; "Flight Of The Dawn Star"—R. M. Williams; "Crucible of Power"—Williamson, and Jack's more recent "Hindsight."

In case I get too much argument over the above-mentioned tally I threaten to send in my single-star list as a supplement which should settle all such disturbances for once and all.

Now to your July aggregation. I'll save "Crisis In Utopia" and proceed to the number one spot. Yep, you guessed it—Kurt von Rachen's "Idealist." It was so good, it hurt to read it. I'll never get over that yarn—unless by some miracle we get a sequel in the near future. In spite of the argument that a sequel ruins one's first acquaintance with a story, I demand a continuation! Surely, Mr. von Rachen is

not hard-hearted enough to let the gallant soul of Steve Galbraith drift on into oblivion without ever another word as to his very uncertain fate. Why—it . . . it's inhuman! And as to the gal propagandist, Vicky Stalton. By Klono's brazen left hind foot—as Kim Kinnison might put it—more, Mr. von Rachen—more—we implore you!

Second place—"Coventry" by Heinlein. A darn good story, but when Dave Mackinnon dived into the river, I was bothered. Wasn't the barrier electric in nature? And I always thought water conducted electricity. Maybe some of you better scientific minds could put me at rest on the subject. How about some explanations: "The Crossing Of The Barrier By Dave Mackinnon" or some such drivel.

"Emergency Landing" and "The Mosaic" tussle for the third-place slot. Who is this Ralph Williams? I demand that he put out a little more data as to where USN-1156 came from. It oughta be agin' the law. I liked "The Mosaic," but I wonder if Ryan hit his sequences of events right. From Ryan's account, it appears that the vanishing of Ismail and his time-world depended upon the death of Duke Martin. It seems to me that the existence of Ismail's world hinged rather on the death of Charles Martel. When the moment of Martel's death came and he continued to live—then was history changed, and then should Ismail have vanished—*pouf!* The only way it could have occurred as Ryan penned it was for Ismail to have slain Duke Martin exactly at the same instant that Charles The Hammer was killed according to the Moslem histories. Corrected for daylight saving times, et cetera, of course. Oh, well, enough nonsense.

How about some more stories by C. L. Moore and Don Stuart? And you, too, might turn your hand to a narrative, Mr. Editor. It's been a powerful long time since I've read a Campbell tale. I believe the last was "Planet of Eternal Night," or was it? Well, regards, and so long till your atomic-steam-turbine-hydrogen-ion-propulsion scheme comes true.—John Patrick, Georgetown, Texas.

Wanna bet 1940 won't match 'em?

Dear Mr. Campbell:

Upon consulting the Analytical Lab in the July issue, I let off a piercing shriek and toppled flabbily from my chair. I was resuscitated after some time, and since,

I have felt a steadily strengthening resolve to tear up comrade Simak's "Rim of the Deep" and ram it down his gullet.

I lunge, without preliminary skirmish, to the attack.

Simak's most blatant offense is that his characters are the swearingest I can think of offhand. Chappies, who deal out hells and damns as promiscuously as did Nagle and Gus and the Rat and Hellion, use certain qualifying words which are not customarily printed in journals one leaves lying about the house. Without those, the author might better use heck and darn.

And further, Simak's cuttlefish, octopodes and such are infernally hard to tame.

Also, Simak, it will take a sinful amount of hydrofluoric acid to produce the effect mentioned, especially considering all that sea water just waiting to dilute the stuff, and also considering that ten inches or upwards of quartz would be needed at that depth. Goodness me, Cliff.

Worse still, Kramer illustrated it, and the work was characteristically foul.

And yet the Lab rates it first.

Oi!

Brother McGill of our far line of defense writes a nicely different letter, and since the season is not yet closed, apparently, I present my nominations for the best stuff of '39 which you will see differs but little from his.

Why he included "General Swamp" and "The Morons" and "Special Flight" and neglected material of the caliber of Stuart's strangely beautiful "Cloak of Aesir" and Moore's "Greater Than Gods" puzzles me endlessly though.

"Gray Lensman"
 "Cloak of Aesir"
 "Crucible of Power"
 "One Against the Legion"
 "Black Destroyer"
 "Greater Than Gods"
 "Discord in Scarlet"
 "The Day Is Done"
 "Maiden Voyage"
 "Sculptors of Life"

1940 will never match those.

Covers? Without exception the finest. Rogers' July being your best since he did Kinnison and back further still to the time Schneeman dreamed up his breath-taking view of Saturn. The only thing that can be said is "More."

A casual glance over recent files reveals:

That the July issue is—thus far—1940's best.

That the February number, with special

tripe souffles by Rocklynnne, Hubbard, Fyfe and Brackett, was the poorest.

That all three stories by van Vogt, who perhaps even more than Heinlein is Astounding's writer of the year, were atrociously illustrated.

That Astounding needs a Williamson novelette of the "Crucible of Power" level.

That Don Stuart, conspicuous in his absence, is the greatest short-story writer the science field has produced, bar none, and that his apparent loss is the saddest blow science-fiction has suffered since the death of Weinbaum.

That Isaac Asimov should ignore the Rogers coalition long enough to do something as good as "Trends."

That Willy Ley should do an article on numbers and de Camp one on sleep—two of the most fascinating and inexplicable subjects known.

That Wallace West should be heard from again.

That, for your records, the July issue ranks thus:

"Coventry"
 "The Idealist"
 "Dark Mission"
 "The Red Death of Mars"

That Knight's new serial, bolstered enormously by Rogers' cover, looks very good.

That "Final Blackout" was everything you said it would be.

That in the interests of the slide rule fraternity here is one that will fit nicely into the relativity of time and other basically fundamental concepts. Two space-ships belonging to enemy fleets take off at the same instant from diametrically opposite sides of Earth. The date of take-off is given in the log and port records as September 1st—the other as September 2nd. They rise into space and engage each other; finally return to their bases. Catch—what is the date of the engagement?—Carl H. Anderson, Petoskey, Michigan.

I have a feeling we'll be getting praise on "Final Blackout" for months to come!

Dear Mr. Campbell:

At last I get up the courage and energy to write to one of the two fiction magazines I read. The other, of course, is *Unknown*.

First, I must compliment you on the covers lately. If, as it appears, you intend to use Rogers for all of them, I'll have no complaint. Every one of his covers has

been superb. He's very open to suggestion, too. I noticed that when a fan criticized his portrayal of the tank on the February cover, he followed all the suggestions on the April cover. I like him on, the inside, too, along with Wesso, Schneeman, and the Isips. The only artist I can't stand is Koll, and, incidentally, I'd like to know if Kolliker is the same person. It seems so, from their so-called illustrations. The fan who called Koll a werewolf hit the nail right on the head. He must do his stuff in the throes of the D. T.'s. *Brrrr!*

The stories this year are some of the best you've ever had. The serials are the peak of science-fiction. I include "Gray Lensman" even though most of it was in 1939, because I think it is typical of this year's stuff.

"If This Goes On—" was a swell story, and a new idea, but I don't see why a pearl of science-fiction like "Final Blackout" did not rate your Nova designation. What an atmosphere, what a character, what power! Note also the predictions in this story. I noticed that bit in "Legion of Time" that prophesied the fall of Paris in 1940, too, but you beat me to it by reprinting it in the August issue. "Final Blackout," however, makes lots of predictions, and notice that France already has become Fascist, with mentions of restoring the monarchy.

I see that the controversy over "General Swamp, C. I. C." still rages, so I might as well get a word in. It's just a very clever story of the American Revolution, put into the future, and placed upon Venus. There are modifications of the Indians, the Hessian mercenaries, the Minute Men, the British Regulars, even the continually squabbling Congress. Brand Martel is an idealized and much more glamorous George Washington. As for the names of the colonies, one fan has already pointed out the fact that many of the Indian names of cities and towns on this continent are worse jawbreakers than the ones in the story.

I agree with those who say you should be more careful which stories you print in Astounding and which in *Unknown*. Such yarns as "Divide and Rule" seem to me fit material for Astounding, while a weird little piece of work like "Emergency Landing" certainly belongs in *Unknown*.

That goes for your artists, too. I wish you would keep Koll, Cartier, Kramer, and the rest of the surrealists in *Unknown*. The illustrations for "Vault of the Beast" were much too unreal for my taste. Speaking of "Vault of the Beast," van Vogt is getting better with each story. I'm waiting impatiently for "Slan."

Well, the best of luck to Astounding,

Statement of the Ownership, Management, etc., required by the Acts of Congress of August 24, 1912, and March 3, 1933, of Astounding Science-Fiction, published monthly, at New York, N. Y., for October 1, 1940.

State of New York, County of New York (ss.)

Before me, a Notary Public, in and for the State and county aforesaid, personally appeared H. W. Ralston, who, having been duly sworn according to law, deposes and says that he is Vice President of Street & Smith Publications, Inc., publishers of Astounding Science-Fiction, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: *Publishers*, Street & Smith Publications, Inc., 79-89 Seventh Avenue, New York, N. Y.; *editor*, John W. Campbell, Jr., 79 Seventh Avenue, New York, N. Y.; *managing editors*, none; *business managers*, none.

2. That the owners are: Street & Smith Publications, Inc., 79-89 Seventh Avenue, New York, N. Y., a corporation owned through stockholdings by Ormond V. Gould, 89 Seventh Ave-

nue, New York, N. Y.; Gerald H. Smith, 89 Seventh Avenue, New York, N. Y.; Estate of Ormond G. Smith, 89 Seventh Avenue, New York, N. Y.

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H. W. RALSTON, Vice President,
Of Street & Smith Publications, Inc., publishers.

Sworn to and subscribed before me this 30th day of September, 1940. De Witt C. Van Valkenburgh, Notary Public No. 84, New York County. (My commission expires March 30, 1942.)

and put down one vote for "Final Black-out" as the best story of the year.—Alfred Berger, 65 Arden Street, New York, N. Y.

Rogers has a unique record among science-fiction artists: every time he does a cover, the author of the story involved writes him fan mail, and asks me for the cover original. E. E. Smith, Norman L. Knight, Robert Heinlein, and Lester del Rey have all praised his picturing of their stories, spontaneously.

Dear Campbell:

Well, last month—July issue of Astounding—I was going to comment on your cover for "Crisis In Utopia." Somehow I let it slip past. This month, after looking at Rogers' illustration for "The Stars Look Down," I have to gush. I note again the metallic blue or gray, or whatever, which so greatly worked to make the Rogers' for "Gray Lensman" the best cover yet, and which was used slightly last issue. You tell Mr. Rogers that us guys appreciate him. And, of course, I won't overlook the obvious part you play in the construction of those covers.

Seems to me I've been hearing a lot of balderdash about Astounding being the worst illustrated of the litter. Whether true or not, I'm not prepared to say. All I know or care about is what I see in this issue. Tell Kramer he topped himself and everybody else with the illustration for "Rendezvous." That's a honey. Next comes the interior for "The Stars Look Down"—and I like that lettering. Then our grotesque Mr. Cartier—orchids always to him. The remaining illustrations still top anything in the pulp field.

I haven't read the stories yet, so can't comment—anyway, the primary purpose of this letter was to put Rogers and Kramer in their place—way up.—Ross Rocklynne, 1110 Wm. Howard Taft Rd., Cincinnati, Ohio.

Notes on Mount Palomar from R. S. Richardson.

Dear Mr. Campbell:

Made my first trip to the two-hundred-inch last week and thought perhaps your readers might be interested in a few random remarks about the state of progress there.

I think I am safe in saying that Mount Palomar goes far beyond the average

astronomer's idea of an observatory. Instead, I imagine it is much closer to Cecil B. DeMille's conception of what an observatory should be. In particular the bathroom motif appears to have been strongly emphasized; it seemed to me every other door I opened disclosed a gleaming array of plumbing fixtures and white tile.

Work on the interior of the various buildings looks to be nearly complete. The mounting for the big mirror is all in place except for the topmost section that holds the central observing capsule. As for the mirror itself down in Pasadena, about another year at least and possibly much longer, is as far as those on the inside will commit themselves.

After working in some dark rooms whose chief equipment has consisted of a sink, a leaky faucet, a safe light, and a miscellaneous collection of bottles, pans, cracked beakers, et cetera, the dark rooms on Mount Palomar are a revelation. There are large stainless steel sinks, water that comes out of the faucet at precisely sixty-seven degrees, a dumb waiter connecting dark room and telescope, drying cabinets, and oh, yes—a bathroom just around the corner.

But I got my greatest shock on entering one of the other rooms. My immediate impression was that I had somehow gotten into a cocktail lounge. There was the familiar, intimate atmosphere, the modernistic furniture with its deep, red leather upholstery and chromium plate, the general invitation to sit down and relax awhile. My eyes instinctively roamed around in search of the bar.

"This is the midnight lunchroom," my guide remarked. And then apologetically, "Of course, it isn't quite finished yet, but we hope to have it done very soon now."

Lunch was at a camp temporarily built to house the men doing construction work on the mountain. Certain parts of the globe are said to be threatened with famine, but Mount Palomar is not one of them. The service was naturally very plain, but the food was excellent and there was an abundance of it. Two kinds of meat, four vegetables, a salad, stacks of delicious raisin bread, followed up with a big wedge of cherry pie. So far as I am aware, no one heralded my arrival, but what difference did it make when there was enough for a half a dozen unexpected guests?

From a thousand to two thousand people visit the mountain each day, but they come and go all the time, so there are never many about at any one time. On this day a special group was being piloted about the

place, getting a peek into corners ordinarily hidden from the public eye. It doesn't sound possible, but believe it or not, these people were professional toastmasters, organized under the C. I. O. The man on the mountain who talked to them over the phone understood that they were postmasters, which led to some confusion when they finally arrived.

You leave Mount Palomar with the feeling that an astronomer who works there very long is going to become utterly useless for service any place else. Whether all those bathrooms and the modernistic furniture are going to register on the final product of an observatory—the photographic plate—I don't know. But one thing is certain, with the world in the chaotic state it is in right now, Mount Palomar is going to be the last word is astronomical magnificence—the observatory of tomorrow—for a long time to come.—R. S. Richardson, 813 Santa Barbara St., Pasadena, Cal.

In England they have a special British edition; in Australia—

Dear Mr. Campbell:

I write to you for the first time, not in a spirit of criticism, nor yet in a desire to praise, and without even a list of best stories of some year or other. I am part of that great army of whom you never hear—the completely satisfied customer. Please don't think me complacent and smug, or in any way sneering at the many fellows who write to the various departments. Far be it from me to decry them, for I realize they made, and are still making, the form and character of the priceless pair—*Unknown* and *Astounding*. And there, in a word, you have my reason for writing—PRICELESS. It is absolutely impossible to buy them now in Australia.

To conserve dollar exchange—for the purpose of buying planes, et cetera—no money is allowed to be sent out of the country. Ever since you took over, Mr. Campbell, I have been a steady reader. Can you imagine never seeing another *Unknown* or *Astounding*? Horrible thought, isn't it? The last number I read—pardon me while I wipe away a tear—contained the second part of "Final Blackout." A good title in my case; I may never read the end. What I suggest is that some reader who realizes my agony may take pity on my plight, and write to me, with the ulti-

mate possibility—sounds familiar—of exchanging magazines. We certainly have no De Camps or Vogts. But we turn out some very entertaining weeklies.

If the worst comes to the worst, tell the office boy to write me and tell me what became of the Lieutenant.—George R. Thomson, 44 Curlewis Street, Bondi, Sydney, N. S. W., Australia.

Is Cartier's style adapted to Astounding covers, though?

Dear Mr. Campbell:

Once again an issue of *Astounding* inspires me to indulge in a bit of commentary.

Listed in the order of preference for the A. L., here is my opinion of this month's yarns.

"Blowups Happen." Excellent. I am always somewhat leery of new authors for some reason or other, but Bob Heinlein has more than proven his exceptional abilities. In my collection I have seven stories by Heinlein, at least four of which rated Excellent.

"Homo Sol." Good. Isaac Asimov is one of the boys who has been around in the field of science-fiction for some time now. Hence, it is nice to note that he is fast becoming a writer of no mean abilities. Congrats on a swell yarn, Isaac!

"Quietus." Good. In my last letter, written about nine months ago, I mentioned that Ross Rocklynne had graduated into the ranks of really skillful writers, i. e., those writers who have a sense of drama and who can portray it well. This story backs up that statement in a most ego-soothing manner.

"Emergency." Fair. This yarn would have rated Good except for the fact that it took about four pages to get under way, which is, I believe, too long for any pulp story, unless novel length, to use to introduce characters, situation, atmosphere, et cetera.

"The Kilkenny Cats." Fair. Usually when an editor lays out good money for a series of stories, I lick my chops in anticipation of a particularly succulent bit of reading. So I did this time, but—disappointment! Although quite readable, these yarns have not been of sufficient merit to warrant sequels.

As usual, I am not including the serial in the line-up because of the fact that I don't read them until I have all the parts. However, as a sort of off-side compliment,

may I state that it took real, honest-to-goodness will power to refrain from reading all of Part I of "Slan" after I had read the first page accidentally. I expect great things from this yarn when I finally do sit down to read it about four months from now.

A cover of this sort rates a page or so explaining it. How's about it, next time? Although O. K., this, in my opinion, does not come up to the standard of the other astronomical covers.

I don't understand your choice of artists. The work of the Isips, Kramer, Kolliker, Schneeman, et cetera, has become so very stale. I still believe that H. W. Wesso is the finest all-around pulp illustrator. Edd Cartier tops your staff artists by a few light-centuries. How about some work, on covers, by Cartier in Astounding, in view of your new *Unknown* cover policy?

All in all, I still consider Astounding as the top mag publishing new stories.—Don P. Bellaire, 684 Royce, Altadena, Calif.

Asimov is one of those authors who has to work long and hard to get his story, but is apt to have something worth while when he comes up for air.

Dear Mr. Campbell:

You may believe it or not, as you choose, but the best news in the new Astounding isn't van Vogt's "Slan," or even Robert Heinlein's "Blowups Happen"—though both these stories are epics in the best meaning of the word. The top item of the month is Isaac Asimov's second and most important contribution to Astounding, "Homo Sol." The plot is new in science-fiction, I think, and Asimov explored the possibilities it offered to rather more advantage than might be expected from an author who has been writing for so short a time. All this means, simply, that we must have more stories from Isaac "A" before very long. Can you arrange it, Mr. Campbell?

Forgetting Norman Knight's rather disappointing serial in the July and August numbers, his shorter stories are mostly pretty fine fantasy, more of which would not be at all unwelcome. "Bombardment in Reverse," a few issues back, was price-less, and typical of his best output.

Rocklyne's "Quietus" is the author's best since "And Then There Was One," last February. Of course, the lack of a formal "happy ending" may distress a few, but most will accept it for what it is

—a very swell short story, with a "different" twist.

Kurt von Rachen comes into his own with his second Astounding story—"The Kilkenny Cats" is very fine indeed. And the conclusion of the yarn being what it was, I've an idea we haven't seen the last of "The Idealist" at all. No complaints here.

Rogers' astronomical cover this month is very, very fine. But, the article it illustrates doesn't touch the pic. Rogers is tops, but use Finley, Gladney, Schneeman and Wesso occasionally. But not Paul!

I'm glad L. Sprague de Camp is scheduled for next month. If his new yarn is only *nearly* as good as "Hyperpolosity" or "The Emancipated," it will be quite good enough, and probably top the issue at that.—Stanley Wells, 131 Fillmore Street, San Francisco, Calif.

Psychology could improve a lot, though, without becoming dangerously oppressive!

Dear Mr. Campbell:

Although only a semisporadic writer of letters to science-fiction editors, it still seems remarkable that I've written to you no more than I have. I've just taken Astounding for granted, I suppose.

But the fact remains that, month in and month out, Astounding is the only science-fiction mag which I read completely through. This, the September issue, rounds out seven full years under Street & Smith, and this last is, without a doubt, the best of the seven. The difference was noticeable while reading each issue for the first time; viewed in retrospect it becomes indeed startling.

The quality of the stories has improved. There is improvement in the writing, in the plots, in the character developments, but it is especially prominent in the viewpoint. For the first time in the history of science-fiction, you are presenting, consistently, stories that make the reader think!

For years the average science-fiction story was a tale of incredible happenings in impossible surroundings, with unbelievable characters. The stories all tried to be "different," and as a result became almost stereotyped in the sameness of their difference. Astounding was no exception; in fact, the "Thought-variants" of '34 did more than anything else to popularize the type. And, I may as well admit, I enjoyed them; they were a vast improvement over

the previous adventure stories in alien surroundings so well liked by the old Clayton Astounding, and almost as greatly superior to the slower, more scientific, but essentially identical tales of the other contemporary mags.

But the Astounding Science-Fiction of the past year has brought forth a new type of story, best described, perhaps, as "sociological" science-fiction. The spaceships, and all the other mechanical standbys—plus a few new ones such as Heinlein's rolling roadways—are still present, but more emphasis has been placed on the one item which will have more to do with shaping the future than anything else, that strange race of bipeds known as man. In short, sociology has been recognized as a science equal to and even above the others in importance.

To be sure, sociology in science-fiction is not entirely unknown. Schachner wrote such stories as "Ancestral Voices" and "I Am Not God" several years ago. But the approach which has brought forth "If This Goes On," "Final Blackout," "The Idealist," and "Slan" is new.

I haven't started "Slan" as yet, preferring to wait until the entire story is on hand, but the complete stories rate as follows: First, Asimov's "Homo Sol," a quite ingenious tale, although to one without Isaac Asimov's interest in mythology the ending hardly seemed logical. Next was "Blowups Happen." In one short year Heinlein has become one of the best, and one of the most consistent, writers in the field. Third was "The Kilkenny Cats," not up to "The Idealist"—best short of the year—but still promising a great series. Rocklynne's "Quietus" was fourth, and good enough to rate first in most mags. "Emergency" was a poor last; must have slipped in when the editor wasn't looking. As usual, both articles were excellent.

And now a complaint, strangely enough, against the two stories I rate highest this month. Both Asimov and Heinlein treat psychology as an exact science, usable in formulas, certain in results. I feel called upon to protest. It's very nature prevents psychology from achieving the exactness of mathematics. Great advances are being made, and greater advances will be made, in the science of determining human reactions; but in the future, as now, psychology will deal in possibilities and probabilities, but not in certainties. A stimuli applied to a grasshopper may always bring forth the same reaction, but men vary; and the moment men stop varying and the psy-

chologist can say definitely that all men are alike psychologically, progress stops and the world becomes a very boring Utopia. It takes a mind quite at variance with the average to produce a great invention, or an ax murder.—But the theme does make for interesting stories, so don't stop using it on my account.

I might add that I'd like to get in touch with other fans, if any, in these parts.—Lynn Bridges, 7730 Pitt, Detroit, Mich.

We've shown Saturn already.

Dear Editor Campbell:

Once again Rogers is the leader, with his astronomical cover the best out of eleven covers printed during the month of August. One protest, though, is the use of mythical or hypothetical spacial bodies before the more common and "homey" planets are exhausted. How about a ship amongst the denser portions of an asteroid belt; or a rocket about to emerge from the "rings" of Saturn with the planet and its phenomenal offspring off in the distance; or the remaining planets and a special plate of the primary, not to mention a decent depiction of Luna and Mother Earth from some place in space. Nebulae, comets, et cetera, can wait till Sol's strange brood has been mugged or "cheese-caked," if you prefer.

The Richardson article explaining the Einstein Eclipse was happily lucid.

It is with strong—I might even use "phenomenal" if it hadn't occurred before in this note—self-control that I abide by my rule of reading serials in one lump and refrain from devouring that wonderful-sounding "Slan." As a slam-bang salesman, Mr. Campbell, you could sell buggy whips, et cetera. You've got me positively drooling to get at the van Vogt masterpiece—and I hope you're glad.

I thought that Heinlein's novelette would bore me stiff—as did Vincent's "Power Plant" last year—with weird equations, symbols and theories. But, on the contrary, I enjoyed it immensely; and although the atomic explanations were mostly vague to me and the psychology a bit hazy, the author did such an expert job of storytelling and sensible explanation—an item most authors, unfortunately, shamefully neglect—that I gladly give it the winning number, and at the same time ask for more yarns stressing the psychological accents of science. The Asimov story, "Homo Sol," will do admirably in this case, and I wish

to exclaim most loudly that this is the finest tale yet written by Mr. Asimov. His first really concise bit of writing does much to warrant his constant appearance in these pages.

It was nice to see a sequel to "The Idealist"; I give it third place and eagerly await the further adventures of K. von Rachen's outré conglomeration of political madmen. The author certainly does not choose sides in this weird battle.

"Quietus" is fourth; I'm sorry this is so far down, but being in no mood for tragedy and sorrow, I was annoyed. "Emergency" is good—but so vague. Only decent illustration was jacket for "Slan"; Charlie is both expressive and oppressive.—Charles Hidley, New York, N. Y.



SCIENCE DISCUSSIONS

Well, I dunno, but it is, anyway!

Gentlemen:

"Vault of the Beast" was a good tale. Contrast this story with those in which the overworked characters begin by rearranging the entire Universe and progressively take care of everything—right down to fitting the one hundred forty-four headed abogops with false teeth. One is a story, the other is a catalogue. Pardon me, I like to read catalogues, too.

Anyway, van Vogt did right well, and he sure knows life. By having his "greatest mathematical mind in the Solar System" be a likable, money-loving, and power-seeking individual, instead of a sacrificing,

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altruistic scientist, he is unfortunately in agreement with the status quo.

Yes, it was a good story, but how did the hero solve the problem? Oh, sure, the explanation is there, but I don't get it. Stupid maybe? And so, if you will pardon me, I will rebuild my ego—at your expense. Here is a problem which may be of interest to muddled fellow mathematicians:

The following paradox baffles me as much as it may you. I remember from high-school algebra that the book made two apparently contradictory statements in its discussion of the multiplication of two negative numbers:

(1) A negative times a negative and a positive times a positive both give a positive product. O. K. if they say so. But, the book in explaining positive and negative numbers, made a statement something like this:

(2) Take a line of infinite extent in both directions. Place a point on this line and call it zero. Pick a unit length. Using this unit, lay out length in both directions. Call numbers on one side positive and those on the other side negative. In short like the scale on a thermometer. Note that the zero point, unit length, and plus and minus sides were all arbitrarily chosen. With the exception of man-made conventions, the figure is symmetrical.

Well, then, why should two numbers on the negative side have a product which lies on the positive side, while the product of positives also lies on the positive side? What does this do to nature's symmetry?—Jason Ellis, Belle Fourche, S. Dak.

Concerning prime numbers.

Dear Mr. Campbell:

A. E. van Vogt's story "Vault of the Beast" in the August issue of *Astounding* is the cause of this letter. If I did not consider Mr. van Vogt to be one of the foremost authors of science-fiction, I would not bother to criticize the story. Although there is a resemblance to an earlier story by the same author—"Discord in Scarlet," which appeared about January, I believe—there are enough new ideas in it that I won't accuse him of lack of originality. However, I do wish to point out certain mathematical fallacies in the author's explanations.

In the first place, there is no such thing as the "ultimate prime number." This was first proved by Euclid centuries ago, and

this is one of Euclid's theorems that have stood the test of time. The proof is not difficult. Suppose p is any prime number. Then let the product of all primes less than or equal to p be represented by k . Then k plus one is not divisible by any prime factor of k . Therefore its prime factors must be larger than p and hence larger than any prime number, since p is any prime.

In the second place, Mr. van Vogt speaks of infinity as though it were some single huge number. This is a common misconception. The term "infinity" actually does not denote a numerical quantity, but simply the absence of a limit. Furthermore infinity cannot be said to be either prime or composite in the sense in which those two terms are defined. In fact, we simply cannot operate with infinite quantities as though they were finite. If we could, we might argue—with as good logic as Mr. van Vogt uses to prove infinity is prime—that infinite quantities could not be prime. Thus we might say that, since there are an infinite number of possible factors of infinity, at least one must be a factor; or we might argue that, since prime numbers become more and more scattered the higher we go among the integers, they must accordingly cease to exist at infinity. Both of these arguments, however, are fallacious.

Mr. van Vogt speaks of "infinity minus one" being a number divisible by two. There is really no such number as that. In fact it can be shown that if any finite number is subtracted from an infinite quantity, the remainder is still infinite. Now if infinity minus one—which is still infinity—is "divisible by two," and infinity is a prime as Mr. van Vogt proclaims—whoa! How's that again? Remember that $\infty - \infty$ is an indeterminate form and may even be infinite.

Although I am not quite certain what the author meant by having the time lock "integrated to the ultimate prime," I believe he could have avoided these errors by the use of some very large finite prime.

While I am about it, I might as well make the usual requests for future issues—more stories by van Vogt, Robert Heinlein, Ross Rocklynne, Jack Williamson, Harl Vincent, Malcolm Jameson; more articles by writers like McCann and Ley; and by all means fewer stories of the type of "Final Blackout" and "General Swamp C. I. C.," which impress me as simply war stories with such science as they contain thrown in merely as an afterthought.—Glen Taylor, 503 South Jackson, Kansas City, Mo.

SLAN

By A. E. van Vogt



SLAN

By A. E. van Vogt



Part III of Astounding's first NOVA serial; the greatest story of the superman that science-fiction has produced, and fully meriting the title "classic of science-fiction."

Illustrated by Schneeman

Synopsis

Slans are a strange, superior race, resembling human beings, their only outward difference being the golden, thought-reading strands or tendrils in their hair. Inwardly, the difference includes a double heart, abnormal nervous and muscular strength and superhuman intelligence. Human beings and the dictator government of Kier Gray accuse them of every known crime, the most vile being the use of mutation machines on human mothers with a resultant crop of monster babies. Slans are hated so ferociously that they are either killed at sight or captured and executed.

Jommy Cross, a slan youth, is convinced that all these stories are lies, products of incessant human propaganda. He does not know himself what the truth is, but his own purpose is to find other slans, and by using the great weapon his father has invented, not only discover the truth, but force human beings to live on friendly relations with slans.

At nine years of age he is wounded while escaping the secret police of John Petty, who have killed his mother. In this weakened condition, he is captured by an old woman junk dealer named Granny. Realizing that her obscure home offers an ideal hiding place, he agrees to steal for the vicious old criminal.

He accidentally runs into a type of slan who cannot read minds, and indeed lacks the golden, betraying slant tendrils that make mind reading possible. Following the tendrillless slant to Air Center, he discovers that this center of the Earth's aviation industry swarms with tendrillless slans. He is puzzled by the fact that they all keep their own minds and thoughts shielded. In spite of the caution this arouses, he reveals himself. They instantly try to kill him.

Escaping to the roof, he sees a spaceship take off for Mars, and during the years that follow, gradually realizes the vastness

of the tendrillless-slant organization, whose existence is not even suspected by the human beings, and was never even guessed at by his parents.

Meanwhile, he has discovered, during brief contact with the chief of secret police, that John Petty, the fanatic slant hater, is plotting the overthrow of the dictator, Kier Gray; and that Petty proposes to accomplish this by the assassination of a slant girl named Kathleen Layton, who is held prisoner in the wonderful Grand Palace. Unknown to Jommy, Kier Gray foils this plot, but John Petty remains in power. Six years later, when Jommy Cross is fifteen and Kathleen Layton is seventeen, the dictator also prevents one of his cabinet ministers from making Kathleen his mistress. His own interest in Kathleen is the purely impersonal one of a scientist studying a new species, and he desires no interference.

It is on his fifteenth birthday that Jommy is betrayed by drunken old Granny, who has become alarmed for her own safety at the continued presence of a slant. The police searching for him everywhere, he takes Granny with him—she would have been executed if he had left her behind, and he feels that he owes her something—and captures a spaceship from the tendrillless slant stronghold. Escaping into the sky, he notices a sudden cessation in the thought of Granny from the next room. He whirls from the spaceship's control board—and is confronted by a handsome tendrillless slant woman. By a trick, she disarms him, and then announces coldly that she intends to kill him instantly.

IX.

TENSE with shock, Jommy Cross stared at the little gun held so firmly, so unwaveringly by the tendrillless slant woman. For the moment he

was preternaturally aware of a background to his chagrin: the smooth-flowing, enormously swift movement of the ship. There was no acceleration, simply that tireless, hurtling pace, the mile on mile of headlong flight, whether in Earth's atmosphere or in free space no longer mattered.

He stood there dismayed, but quite empty of terror—and empty of plan. The woman, Joanna Hillory, had used her very defects to defeat him.

She must have known her thought shield was faulty; and so, with the purest of animal cunning, she had allowed that pathetic little story to leak through, designed to show him that she would never, oh, never, have the courage for a fight to the finish. It was easy to see now that her courage was a chilled-steel affair that he could only hope to equal with the years.

He moved obediently to one side as she gestured menacingly, and then watched her alertly as she bent gingerly to pick up the two weapons on the floor, first her own, then his. But not for the barest instant did her eyes shift from him; there was not so much as a quiver of weakness in the way her gun pointed at him.

She put away the small weapon that had tricked him, kept her larger gun in her right hand; and, without a glance at his gun, locked it in a drawer beneath the glowing instrument board.

Logic left no room for the hope that somehow he might trick her into turning her weapon aside. The fact that she had not shot him out of hand must mean that she wanted to talk to him first. But he could not leave that possibility to chance. He said huskily:

"Do you mind if I ask a few questions before you kill me?"

"I'll ask the questions," she replied

coolly. "There can be no purpose in your satisfying any curiosity you may have. How old are you?"

"Fifteen."

She nodded. "Then you are at a stage of mental and emotional development where you will appreciate even a few minutes' reprieve from death. A full-grown slan would disdain such respite, but you, like any adult human being, will probably be pleased to know that so long as you answer my questions I shall not pull the trigger of this little electric-energy gun, though the final result will be death just the same."

Jommy Cross wasted no time even thinking about her words. He said: "How do you know I'll tell the truth?"

Her smile was confident: "Truth is implicit in the cleverest lies. We tendriless slans, lacking the ability to read minds, have been forced by necessity to develop psychology to the utmost limits. But never mind that. Were you sent to steal this ship?"

"No."

"Then who are you?"

Quietly he gave her a brief history of his life. As his story developed, he grew conscious that the woman's fine eyes were narrowing, lines of surprise gathering on her forehead.

"Are you trying to tell me," she cut in sharply, "that you are the little boy who came into the main offices of Air Center six years ago?"

He nodded. "It was the greatest shock of my life to find a crew so murderous that even a child must be destroyed forthwith. The whole affair smacked of madness. It—"

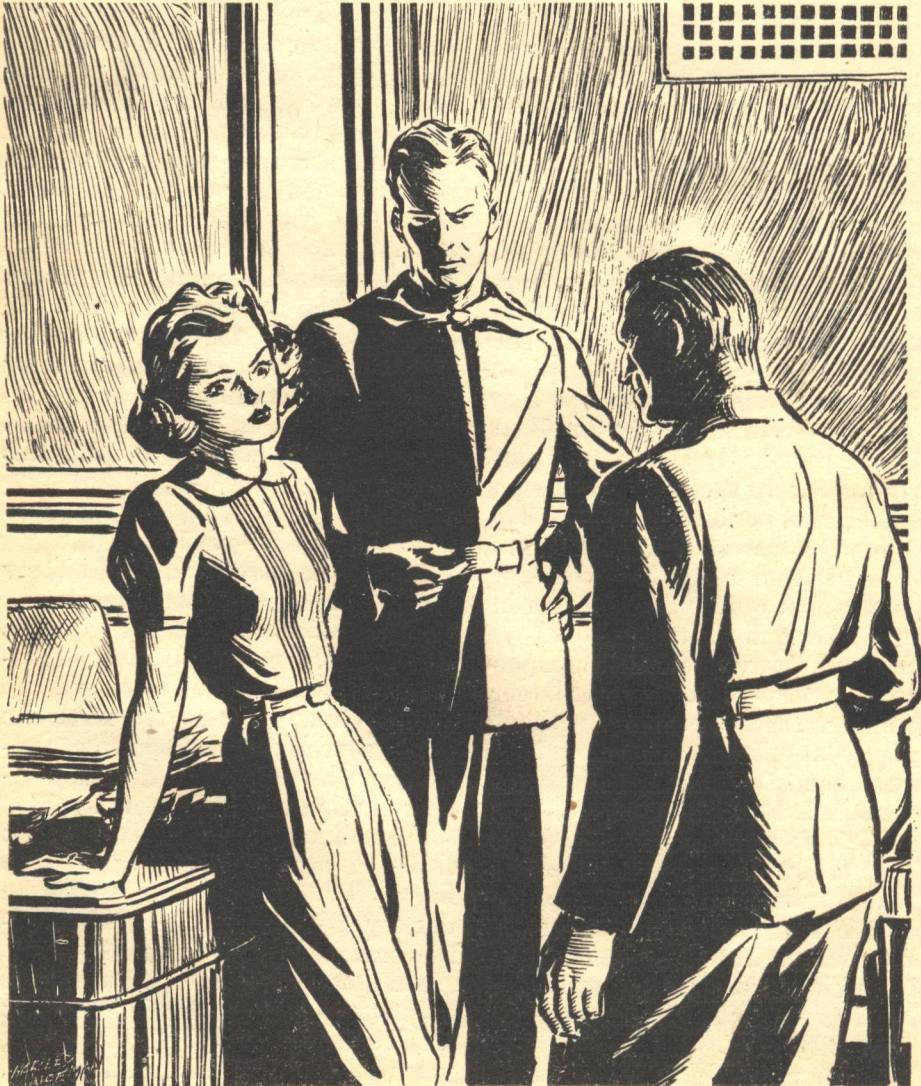
He stopped because the woman's eyes were aflame. "So it's come at last," she said slowly. "For six long years we've discussed and analyzed, uncertain whether we were right in letting you escape—"

"You . . . let . . . me . . . escape!" gasped Jommy Cross.

She ignored him, went on as if she hadn't heard: "And ever since we've waited anxiously for a follow-up from the snakes. We were pretty sure that they wouldn't betray us because they wouldn't want our greatest invention, the spaceship, to fall into the hands of human beings. The

main question in our minds was: What was the purpose behind that first exploratory maneuver? Now, in your attempted theft of a rocket-ship, we have the answer."

STARTLED into silence, Jommy Cross listened to the utterly mistaken analysis. Dismay grew in him, dismay that had nothing to do with



Kathleen stood frozen. Kier Gray was withdrawing his protection—forsaking her to the coldly murderous hate of John Petty and the secret police!

his personal danger. It was—it was the incredible insanity of this slan-versus-slan war. The deadliness of it was almost beyond imagination. Joanna Hillory went on in her vibrant voice, tinged now with triumph:

"It's good to know for sure what we have so long suspected; and the evidence is almost overwhelming now. We have explored the Moon, Mars, and Venus. We have gone as far afield as the moons of Jupiter; and not once have we seen an alien spaceship or the faintest sign of a snake.

"The conclusion is inescapable. For some reason, perhaps because their revealing tendrils make it necessary for them to be ever on the move, they have never developed the anti-gravity screens that make the rocketship possible. Whatever the reason, the chain of logic points inexorably to the fact that they do lack space travel."

"You and your logic," said Jommy Cross, "are beginning to be very tiresome. It seems unbelievable that a slan could be so utterly wrong. For just one second, take a reasonable attitude and assume—just assume—that my story is true."

She smiled, a thin smile that barely touched her lips. "From the beginning, there were only two possibilities. The first one I have already outlined. The other—that you actually have had no contact with slans—has worried us these six years.

"You see, if you were sent by the slans, then they already knew we controlled Airways. But if you were an independent slan, then you had a secret that sooner or later, when you did contact the snakes, would be dangerous to us. In short, if your story is true, we must kill you to prevent you at some future date from apprising them of your special knowledge,

and because it is our policy to take no chances whatsoever with snakes.

"Your death, you see, is as certain as if you were already dead."

Harsh words, icily spoken. But it was not the harshness of the tone that affected Jommy Cross. It was the appalling fact that neither right nor wrong, truth nor untruth, mattered to this slan woman. His whole world was shattering before the overwhelming thought that if this—immorality—was slan justice, then slans had nothing to offer the world that could begin to match the sympathy, kindness and pervading gentleness of spirit that he had seen so often in the minds of the lowly human beings. If all adult slans were like this—then there was no hope.

The brief sense of resignation passed. Death *was* better, perhaps, but it would solve nothing. Especially now that all the papers of his father's secret science, which he had removed from the catacombs such a short time before, would be plucked from the pockets of his corpse and horribly misused in this mad war of slan, human and tendrillless slan.

For a terrible moment his mind hovered over the fearful, dizzying gulf of that senseless feud; and a thought more dark and terrible than night swept him: Was it really possible that his father's great dreams and greater works were to be blotted out in a solitary waste of nothingness, destroyed and ruined by these insane fratricidals?

Never! Not while life and breath remained in his body. In spite of logic, in spite of the certainty that he could not hope to catch a full-grown slan off guard, he must win!

WITH a start, Jommy grew aware that for at least a minute silence had reigned in the speeding ship. His gaze narrowed on her face, conscious

of the shadowy lines of thought in her forehead, a thoughtfulness that yet did not interfere with her alertness. The lines smoothed as she said:

"I have been considering your special case. I have, of course, absolute authority to destroy you without consulting our council; in the event, however, that I decided to take you before them, I automatically lose my power as arbiter. The question is, does the problem you present merit their attention? Or will a brief report be sufficient? It is not a question of mercy, so allow yourself no hope—"

But hope did come. It would take time to take him before the council; and time was life. He said urgently, yet conscious of the need for calm words:

"I must admit my own reason is paralyzed by this feud between slan and tendriless slan. Don't your people realize how tremendously the entire slan position would improve if you would co-operate with the 'snakes,' as you call them? Snakes! The very word is a proof of intellectual bankruptcy, suggestive of a propaganda campaign, replete with slogans and emotion words."

The gray fire came back into her eyes, but there was scathing mockery in her voice: "A little history may enlighten you on the matter of slan co-operation. For nearly four hundred years there have been tendriless slans. Like the true slans, they're a distinct race, being born without tendrils, which is their only differentiation from the snakes. For security's sake, they formed communities in remote districts where the danger of discovery was reduced to a minimum. They were prepared to be completely friendly with the true slans against the common enemy—human beings!

"What was their horror, then, to

find themselves attacked and murdered, their carefully built up, isolated civilization destroyed by fire and weapon—by the true slans! They made desperate efforts to establish contact, to become friends, but it was useless. They finally discovered that only in the highly dangerous, human-controlled cities could they find any safety. There the true slans, because of their revealing tendrils, dared not venture.

"Snakes!" The mockery was gone from her voice; only a hard bitterness remained. "What other word can possibly fit? We don't hate them, but we have a sense of utter frustration and distrust. Our policy of destroying them is pure self-defense, but it has become a ruthless, unyielding attitude."

"But surely your leaders could talk things over with them?"

"Talk things over with whom? In the last three hundred years we have never located a single hiding place of the true slan. We've captured some that attacked us. We've killed a few in running fights. But we've never discovered anything about them. They exist; but where and how, and what their purpose is, we haven't the faintest idea. There is no greater mystery on the face of the Earth—"

Jommy Cross interrupted tensely: "If this is true, if you're not lying, please, madam, let your shield down for a moment so that I can be sure that your words are true! I, too, have thought this feud insane ever since I first discovered that there were two kinds of slans, and that they were at war. If I could become absolutely convinced that the madness is one-sided, why, I could—"

Her voice, sharp as a slap in the face, cut across his words: "What would you do? Help us? Are you under the impression that we would ever believe such an intention, and

allow you to go free? The more you talk, the more dangerous I consider you. We have always made the assumption that a snake, by reason of his ability to read minds, is our superior, and therefore must not be given time to effect an escape. Your youth has saved you for ten minutes, but now that I know your story I can see no purpose in keeping you alive. Furthermore, there seems no reason why your case should be brought before the council. One more question—then you die!”

HIS EYES glittering pools, Jommy Cross stared at the woman. There was no friendliness in him now, no sense of any real kinship between this woman and his mother. If she were telling the truth, then it was the tendriless slans he should sympathize with, not the mysterious, elusive true slans who were acting with such incomprehensible ruthlessness.

But sympathy or no, every word she had spoken showed more clearly how dangerous it would be to allow the mightiest weapon the world would ever know to fall into this seething hell's brew of hatred. He must defeat this woman, must save himself. *Must.* He said swiftly:

“Before you ask that last question, consider seriously what an unprecedented opportunity has come to you. Is it possible that you are going to allow hatred to distort your reason? According to your statement, for the first time in the history of tendriless slans, you have caught a *tendrilled* slan who is absolutely convinced that the two types of slans should co-operate instead of fight.”

“Don't be silly,” she said. “Every slan we've ever caught was willing to promise anything.”

The words were like so many blows; and Jommy Cross shrank from them, feeling beaten, his argument smashed. In his deepest

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thoughts, he had always pictured adult slans as noble creatures, dignified, contemptuous of captors, conscious of their marvelous superiority. But—willing to promise anything! He hurried on, desperately anxious to retrieve his position:

"That doesn't change this particular situation. You can verify practically everything I've said about myself: about my mother and father being killed; the fact that I had to flee the home of the old junk woman in the next room, whom you hit over the head, after I had lived with her ever since I was a kid. Everything will fit in to prove that I am what I claim to be: a true slan who has never had any relationship with the secret slan organization. Can you lightly ignore the opportunity offered here? First, you and your people must help me find the slans, then I shall act as liaison officer, establish contact for you for the first time in your history. Tell me, have you ever learned why the true slans hate your people?"

"No." She spoke doubtfully. "We've had ridiculous statements from captured slans to the effect that they are simply not tolerating the existence of any variation of slan. Only the perfect result of Samuel Lann's machine must survive."

"Samuel . . . Lann's . . . machine!" Jommy Cross felt abruptly almost physically torn, his thread of thought ripped out by the roots. "Are you actually—do you mean it's true that slans were originally machine-made?"

He saw that the woman was staring at him, frowning, her brows sharply knit. She said slowly:

"I'm almost beginning to believe your story. I thought every slan knew of Samuel Lann's use of a mutation machine on his wife. Later, during the nameless period that fol-

lowed the slan war, use of the mutation machine produced a new species: the tendriless slans. Didn't your parents find out anything about such things?"

"That was supposed to be my job," Jommy Cross said unhappily. "I was to do the exploring, the contacting, while dad and mother prepared the—"

He stopped in angry self-annoyance. This was no time to make an admission that his father had devoted his life to science and wouldn't waste a single day on a search he had believed would be long and difficult. The first mention of science might lead this acutely intelligent woman to a real examination of his gun. She obviously believed the instrument to be a variation of her own electric-energy weapon. He went on jerkily:

"If those machines are still in existence, then all these human accusations that slans are making monsters out of human babies are true."

"I've seen some of the monsters," Joanna Hillory nodded. "Failures, of course. There are so many failures."

IT SEEMED to Jommy Cross that he was past shock. All the things that he had believed for so long, believed with passion and pride—the utmost depth of intensity—were tumbling like so many card houses. The ugly lies were not lies. Human beings were fighting a Machiavellian scourge almost inconceivable in its inhumanity. With a start, he grew aware Joanna Hillory was talking:

"I must admit that, in spite of my conviction that the council will destroy you, the points you have raised do constitute a very particular situation. I have decided to take you before them."

It required a long moment for the

meaning of her words to penetrate; and then—a wild, surging relief leaped along his nerves. He hadn't even imagined that he was under such tension. For an instant it was like some intolerable weight lifting, lifting; there came an extravagant sense of buoyancy.

At last he had what he needed so desperately: time, precious time! Given time, pure chance might aid him to escape.

He watched the woman as she moved cautiously over to the great instrument board. There was a click as her finger pressed a button. Her first words reached up, up, to the heights where his hopes were poised, and dragged them to the uttermost low. She said:

"Calling the members of the council. . . . Urgent! . . . Please tune in at once to 7431 for immediate judgment on a special slan case."

Immediate judgment! He was conscious of anger at himself for having had hope at all. He should have known that it wouldn't be necessary to take him physically before the council, when their radio science canceled all dangers from such delay.

He was doomed, unless the council members understood a different logic than Joanna Hillory. An almost hopeless probability.

THE WAITING silence that followed was more apparent than real. There was the continuous thin, beating roar of the rockets, the fainter hiss of air against the outer shell which meant—it suddenly struck him—that the ship was still flying through the thick sheaf of Earth's atmosphere. And there was the insistent thought stream of Granny, the whole combining into anything but silence and—

The impression smashed into fragments. Granny! Granny's active,

conscious thought stream! The old scoundrel was awake, recovered from the blow that Joanna Hillory had struck—the blow that had caused that cessation of her thought, awareness of which had saved his life in the first place. And her tough, resilient body had weathered sudden violence as easily as it had withstood for so long the repeated assaults of liquor.

It was quite obvious that Joanna Hillory, in meeting first his resistance, then pausing to question him instead of killing him instantly, had given Granny time to recuperate from the blow—a blow designed for temporary purposes only, to gain a silent approach on his rear. A killing blow might have made a distinct thud for ears as sensitive as his; the light one had not been long effective.

He opened his mind wide to the flood of Granny's thought. It came in a perfect storm of vibration.

"Jommy, she'll kill us both. But Granny's got a plan. Make some sign that you've heard her. Tap your feet. Jommy, Granny's got a plan to stop her from killing us—"

Over and over came the insistent message, never quite the same, always accompanied by extraneous thought and uncontrollable digressions. No human brain as ill-trained as Granny's could hold a completely straightforward thought. But the main theme was there: Granny was alive; Granny was aware of danger, and Granny was prepared to co-operate to desperate lengths to avert that danger—

Casually, Jommy Cross began to tap his feet on the floor, harder, louder, until—

"Granny hears." He stopped his tapping. Her excited thought went on: "Granny really has two plans. The first is for Granny to make a loud noise. That will startle the

woman and give you a chance to leap on her. Then Granny will rush in to help.

"The second plan is for Granny to get up from the floor where she's lying, sneak over to your door, and then jump in at the woman when she passes near the door. She'll be startled, and instantly you can leap for her.

"Granny will call 'One!' then 'Two!' Tap your feet after the plan number you think best. Think them over for a moment."

No thought was required. Plan One he instantly rejected. No loud noise would really distract the calm nerves of a slant. A physical attack, something concrete, was the only hope.

"One!" said Granny into his mind. He waited, ironically aware of the anxious overtones in her thought, the forlorn hope that he would find Plan One satisfactory and so lessen the danger to her own precious skin. But she was a practical old cuss; and deep in her brain was the conviction that Plan One was weak. At last her mind reluctantly pumped out the word: "Two!"

JOMMY CROSS tapped his feet. Simultaneously, he grew aware that Joanna Hillory was talking into her radio, giving his history and his proposal of co-operation, finally offering her own opinion that he must be destroyed.

The remote thought came to Jommy Cross that, a few minutes before he would have been sitting almost with bated breath, following the discourse, and the answers that began to come in one by one from the hidden loud-speaker. Deep-toned voices of men; rich, vibrant-toned women!

But now he scarcely more than followed the thread of their arguments.

He was aware of some disagreement. One of the women wanted to know his name. For a long moment it didn't strike him that he was being directly addressed:

"Your name?" said the radio voice.

Joanna Hillory moved away from the radio toward the door. She said sharply: "Are you deaf? She wants to know your name."

His whole mind was concentrated irrevocably on Granny's brain as she stood behind the door, tense, waiting—and his eyes blazed at Joanna Hillory so near that door.

"Name!" he said, and a portion of his mind registered surprise at the question. But nothing could really distract him at this supreme moment. It was now—or never! Urgently he tapped his feet.

And in that instant every extraneous thought was shoved out of his brain; he was aware only of Granny's mind and the violent stream of vibration that poured from her. The tensing of her body, the poising for action, and—the startling surge of wild terror.

He froze, while she stood there, her ravaged body threatening to collapse from sheer, unadulterated funk. And then the thousand illegal raids she had made in her black, terrible career rose up to give her strength, the strength of experience. She launched into the room, eyes glittering malignantly, snags of teeth bared like tusks. Like an evil, attacking witch, she lunged against the back of Joanna Hillory. Thin, bony arms embraced the arms and shoulders of the slant woman.

There was a flash of sparkling flame as the weapon in Joanna Hillory's fingers discharged in futile fury at the floor. Then, like a striking snake, she spun with irresistible strength. For one desperate moment the old woman clung to her shoul-



Jommy fled in his lone ship, the battle fleet of the tendriless slan screaming down after him.

ders—that one, all-necessary moment. In that instant Jommy Cross sprang.

In that instant, too, came a shrill squawk from Granny. Her clawlike hands were torn from their holds,

and the gaunt, dark body skidded along the floor, routed.

JOMMY CROSS wasted no time trying to match a strength he felt sure was beyond his present powers to

equal. As Joanna Hillory whirled toward him like a young tigress, he struck one hard, swift blow across her neck with the edge of his hand.

It was a dangerous blow; and it required perfect co-ordination of muscles and nerves. It could easily have broken her neck; instead it skillfully and efficiently knocked her unconscious.

He caught her as she fell, and even as he lowered her to the floor, his brain was reaching into hers, past the broken shield, searching swiftly. But the pulse of her unconscious brain was too slow, the kaleidoscope of pictures too frozen.

He began to shake her gently, watching the shifting pattern of her thoughts, as the steady physical movement brought swift, subtle chemical changes in her body, which in turn changed the very shape of her thoughts.

Still, there was no time for detail; and as the outline of pictures grew more terrible in its menace, he abruptly deserted her and rushed to the radio. In as normal a voice as he could muster, he called:

"I'm still willing to discuss friendly terms. I could be of great help to the tendriless slans."

No answer. More urgently, he repeated his words, and added: "I'm anxious to come to an arrangement with an organization as powerful as yours. I'll even return the ship if you can show me logically how I can escape without putting myself in a trap."

Silence! He clicked off the radio, and, turning, stared grimly at Granny, who was half sitting, half lying, on the floor.

"No dice," he said. "All this—this ship, this slan woman—is only part of a trap in which nothing has been left to chance. There are seven heavily armed, hundred-thousand-

ton cruisers trailing us at this very moment. Their finder instruments react to our anti-gravity plates, so even the darkness is no protection. We're finished."

THE HOURS of night dragged; and with each passing moment the problem of what to do grew more deadly, desperately urgent. Of the four *living* things up there in that blue-black sky, only Granny sprawled in one of the pneumatic chairs in noisy, uneasy sleep. The two slans, and that tireless, throbbing, hurtling ship, remained awake.

Fantastic night! On the one hand was the knowledge of the destroying power that might strike at any minute; and on the other hand—

Fascinated, Jommy Cross stared into the visiplat at the wondrous picture that sped beneath him. It was a world of lights, shining in every direction as far as the eye could see—lights and more lights. Splashes, pools, ponds, lakes, oceans of light—farm communities, villages, towns and cities, and—every little while—mile on mile of megalopolitan colossus.

At last his gaze lifted from the visiplat and he turned to where Joanna Hillory sat, her hands and feet tied. Her gray eyes met his brown questioningly. Before he could speak she said:

"Well, have you decided yet?"

"Decided what?"

"When you're going to kill me, of course."

Jommy Cross shook his head slowly, gravely. "To me," he said quietly, "the appalling thing about your words is the mental attitude that assumes that one must either deliver or receive death. I'm not going to kill you. I'm going to release you."

She was silent a moment, then:

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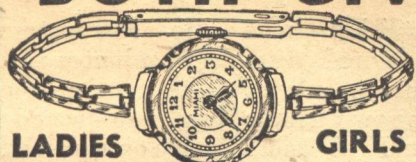


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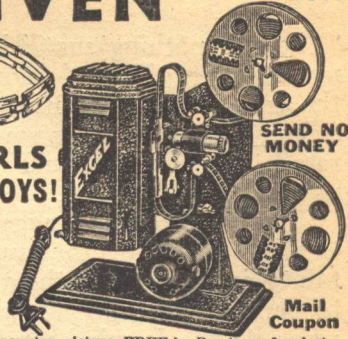
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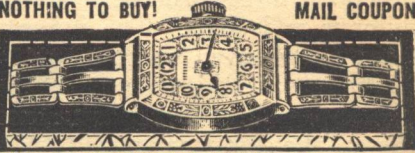
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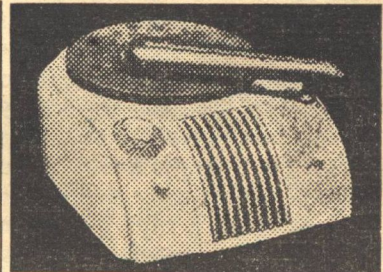
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"There is nothing surprising about my attitude. For a hundred years the true slans killed my people at sight, six hundred years now we have retaliated. What could be more natural?"

Jommy Cross shrugged impatiently. There was too much uncertainty in him about the true slans to permit him to discuss them now when his whole mind must be concentrated on escape. He said:

"My interest is not in this futile, miserable three-cornered war among humans and slans. The important thing is the seven warships that are trailing us at this minute."

"It's too bad you found out about them," the slan woman said quietly. "Now you will spend the time in useless worry and planning. It would have been so much less cruel for you to have considered yourself safe; and then, the very moment you discovered you weren't, to die!"

"I'm not dead yet!" Jommy Cross said, and impatience was suddenly sharp in his tone. "I have no doubt it is presumptuous of a half-grown slan to assume—as I am beginning to—that there must be a way out of this trap. I have the greatest respect for adult slan intelligence, but I do not forget that your people have now suffered several preliminary defeats. Why, for instance, if my destruction is so certain, are those ships waiting? Why wait?"

JOANNA HILLORY was smiling, her fine, strong face relaxed. "You don't really expect me to answer your questions, do you?"

"Yes." Jommy Cross smiled, but without humor. He went on in a tight, clipped voice: "You see, I've grown somewhat older during the past few hours. Until last night I was really very much of an innocent, with a child's idealistic outlook on

life. For instance, during that first few minutes when we were pointing our guns at each other, you could have destroyed me without resistance on my part. Your splendid appearance reminded me so much of my marvelous mother that I couldn't have pulled the trigger to save my soul. You delayed, of course, because you wanted to question me, but the opportunity was there. That situation exists no longer."

The woman's perfect lips pursed in sudden, frowning thought. "I think I'm beginning to see what you're getting at."

"It's really very simple," Jommy Cross nodded grimly. "You either answer my questions or I'll knock you over the head and obtain the information from your unconscious mind."

The woman began: "How do you know I'll tell the tru—" She stopped, her gray eyes widening with apprehension as she glared at Jommy. "Do you expect—"

"I do!" He stared ironically into her glowing, hostile eyes. "You will lower your mind shield. Of course, I don't expect absolutely free access to your brain. That would be like asking you to undress. I have no objection to you controlling your thoughts on a narrow range all around the subject. But your shield must go down—now!"

She sat very still, body rigid, gray eyes agleam with repugnance. Jommy Cross' gaze was curious.

"I'm amazed," he said. "What strange complexes develop in minds that have no direct contact with other minds. Is it possible that tenderless slans have built up little sacred, secret worlds within themselves; and, like any sensitive human being, feel shame at letting outsiders see that world? There is material here for psychological study that may be

the basic cause of the slan-versus-slan war. However, let that go."

He finished: "Just remember that I have already been in your mind. Remember, too, that, according to your own logic, in a few hours what I see will be blotted out forever in a blaze of electric projectors."

"Of course," she replied quickly, "that's true. You will be dead, won't you? Very well, I'll answer your questions."

It was disconcerting. He had expected some uncertainty, a hint of doubt about his fate. But here was only unpleasant sureness, as cold and logical as the death she foresaw for him. Was it possible that there really was no hope?

JOANNA HILLORY'S mind was like a book whose thickness could not be measured, with an almost infinity of pages to examine; an incredibly rich, incredibly complex structure embroidered with the billion billion impressions garnered through the years by an acutely observant intellect.

Jommy Cross caught swift, tantalizing glimpses of her recent experiences. There was, briefly, the picture of an unutterably bleak planet, low-mountained, sandy, frozen, everything frozen—Mars! There were pictures of a gorgeous, glass-inclosed city of great machines digging under a blazing battery of lights. Somewhere it was snowing with a bitter, unearthly fury—and a black spaceship, glittering like a dark jewel in the Sun, was briefly visible through a thick plate-glass window—

The confusion of thoughts cleared as she began to talk. She spoke slowly; and he made no attempt to hurry her, in spite of his conviction that every second counted, that at any minute now death would blast from the sky at his defenseless ship.

Her words and the thoughts that verified them were as bright cut as so many gems, and as fascinating:

The tendriless slans had known from the moment he started to climb the wall that an interloper was coming. Interested primarily in his purpose, they made no effort to stop him when he could have been destroyed without difficulty. They left several ways open for him to get to the ship, and he had used one of them, although—and here was an unknown, unexpected factor—the particular alarms of that way had not gone off.

The reason the warships were slow in destroying him was because they hesitated to use their searchlights over a continent so densely inhabited. If he should climb high enough or go out to sea, the ship would be quickly destroyed.

On the other hand, if he chose to circle around on the continent, his fuel would waste away in a dozen or so hours, and before that, dawn would come and enable the electric projectors to be used with brief, deadly effect.

"Suppose," said Jommy Cross, "I should land in the downtown section of a great city? I could very possibly escape among so many houses, buildings and people."

Joanna Hillory shook her head. "If this ship's speed falls below two hundred miles per hour, it will be destroyed, regardless of the risk involved, regardless of the fact that they hope to save my life by capturing the ship intact. You can see I'm being very frank with you."

For a long moment Jommy Cross was silent. He was genuinely convinced, overwhelmed by the totality of the danger. There was nothing clever about the plan; here was simply a crude reliance on big guns and plenty of them.

"All this," he marveled at last, "for one poor slan, one ship. How mighty the fear must be that prompts so much effort, so much expense, for so little return!"

"We have put the snakes outside our law," came the cool reply. Her gray eyes glowed with a quiet fire; her mind concentrated on the single track of her words. "Human courts do not release criminals because it will cost more to convict them than the amount of the theft. Besides, what you have stolen is so precious that it would be the greatest disaster in our history if you escaped."

He felt abruptly impatient. He snapped: "You assume far too readily that the true slans are not already in possession of the anti-gravity secret. My purpose during the coming years is to analyze the true slans to their hiding place; and I can tell you now that practically everything you've told me I shall not use as evidence. The very fact that they are so completely hidden is an indication of their immense resourcefulness."

Joanna Hillory said: "Our logic is very simple. We have not seen them in rocketships—so they have no rocketships. Even yesterday, in that ridiculous flight to the palace, their craft, while very pretty, was powered by vibration-electric motors, a type of engine we discarded a hundred years ago. Logic, like science, is deduction on the basis of observation, so—"

JOMMY CROSS frowned unhappily. Everything about the true slans was wrong. They were fools and murderers. They had started a stupid, ruthless, fratricidal war against the tendriless slans. They sneaked around the country, using their diabolical mutation machines on human mothers—and the monstrosities that

resulted were destroyed by medical authorities. Mad, purposeless destruction! And it simply didn't fit!

It didn't fit with the noble characters of his father and mother; it didn't fit with his father's genius, nor with the fact that for six years he himself had lived under the influence of Granny's squalid mind and remained untouched, unsoiled, and finally, it didn't fit with the fact that he, a half-grown true slan, had braved a trap he did not even suspect and because of one loophole in their net, one unknown factor, had so far escaped their vengeance.

His atomic gun! The one factor that they still didn't suspect. It would be useless, of course, against the battle cruisers coasting along in the blackness behind him. It would take a year or more to build a projector with a beam big enough to reach out and tear those ships to pieces. But one thing it could do. What it *could* touch, its shattering fire would disintegrate into component atoms. And by God, he had the answer. Given time and a little luck—

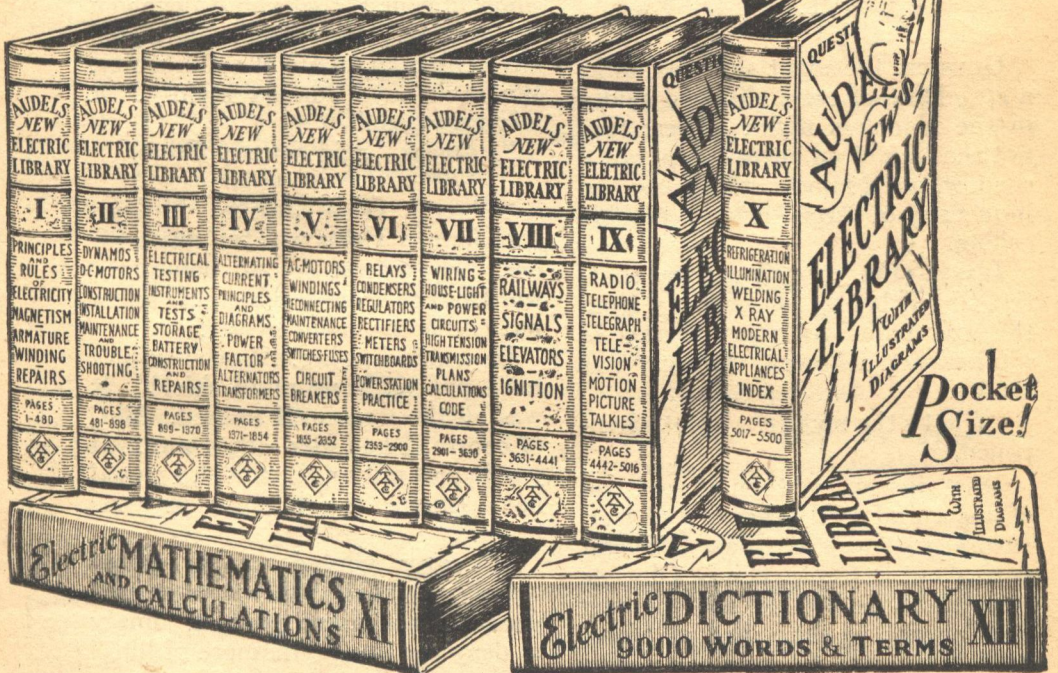
The glare of a searchlight splashed against his visiplates. Simultaneously, the ship jumped like some toy that had been struck an intolerable blow. Metal squealed, walls shook, lights blinked; and then, as the sounds of violence died into little menacing whispers, he bounded from the deeps of the chair into which he had been flung, snatched at the rocket activator.

The machine leaped forward in dizzy acceleration. Against the pressure of plunging fury, he reached forward and clicked on the radio..

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echoed the thought that beat in his mind.

"What are you going to do, talk them out of what they plan on doing? Don't be so silly. If they've finally decided to sacrifice me, you don't think they'll give *your* welfare any consideration, do you?"

It sounded as true as the implication of death that went with every curt-cut word of it.

X.

OUTSIDE, the night sky was dark; a sprinkling of stars glittered coldly in the moonless night. There was not the sign of an enemy ship, not a shadow, not a movement against the immensity of turgid, deep, deep-blue ceiling.

Inside—the tense silence was shattered by a hoarse choking cry from the next room. An angry barrage of vituperation followed. Granny was awake.

"What's the matter? What's happened?"

Brief silence, and then, abrupt end of anger and mad beginning of fear. Instantly, her terrified thought poured out in frantic flood. Obscene fear curses assailed the air. Granny didn't want to die. Kill all slans, but not Granny. Granny had money to—

She was drunk. The sleep had allowed the liquor to take control of her again. Jommy Cross shut her thoughts and her voice out of his mind; urgently he spoke into the radio:

"Calling the commander of the warships! Calling the commander! Joanna Hillory is alive. I am willing to release her at dawn, the only condition being that I be allowed to get up into the air again."

There was silence, then a woman's

quiet voice entered the room: "Joanna, are you there?"

"Yes, Marion."

"Very well," the calm voice of the other went on, "we accept on the following conditions: You will inform us an hour before the actual landing where it will be. The point of landing must be at least thirty miles—that is, five minutes allowing for acceleration and deceleration—from the nearest large city. We assume, of course, that you believe you can escape. Very well. You will have two hours more of opportunity. We shall have Joanna Hillory. A fair exchange!"

"I accept," said Jommy Cross.

"WAIT!" cried Joanna Hillory. But Jommy Cross was too quick for her. The barest second before the word jerked from her lips, his finger flicked off the radio switch.

He whirled on her. "You shouldn't have put up your mind shield. It was all the warning I needed. But, of course, I had you either way. If you hadn't put up the shield, I would have caught the thought in your brain."

His eyes glinted at her suspiciously. "What is this sudden mad passion to sacrifice yourself simply to deny me two hours more of life?"

She was silent; her fine gray eyes were more thoughtful than he had seen them all night. He mocked gently:

"Can it be that you actually grant me the possibility of escape?"

"I've been wondering," she said, "why the alarms back in the spaceship building didn't warn us of the exact way you approached this ship. There is a factor here that apparently we did not take into account. If you should really escape with this ship—"

"I shall escape," Jommy Cross

said quietly, "and I shall live, in spite of human beings, in spite of Kier Gray and John Petty and the ghoulish crew of murderers that live in the palace. I shall live in spite of the vastness of the tendrillless-slans organization, and their murder intentions—and some day I shall find the true slans. Not now, for no youth can hope to succeed where the tendrillless slans in their thousands have failed. But I shall find them, and on that day—"

He stopped; then, gravely: "Miss Hillory, I want to assure you that neither this nor any other ship will ever be turned against your people."

"You speak very rashly," she replied with sudden bitterness. "How can you assure anything in the name of those ruthless creatures who dominate the councils of the snakes?"

Jommy Cross gazed down at the woman. There was truth in her words. And yet—

Yet something of the greatness that was to be his came to him in that moment as he sat there in that finely built control room, with its glittering instrument board, the shining visiplates, his body deep in the beautifully constructed chair.

He was his father's son, heir to the products of his father's genius. Given time, he would be lord of irresistible power. The soft flame of those thoughts was in his voice as he said:

"MADAM, in all modesty I can say that, of all the slans in the world today, there is none more important than the son of Peter Cross. Wherever I go, my words and my will shall rule. The day that I find the true slans, the war against your people shall end forever. You have said that my escape would be disaster for the tendrillless slans; rather it will be their greatest victory. Some day you and they will realize that."

"Meantime," the slan woman



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"It would mean war!" Jommy Cross flared.

Her answer was cold. "We'll smash everything they've got within two months."

"And then what? What about the human beings in that after world? Do you contemplate four billion slaves in perpetuity?"

"We are immeasurably their superiors. Shall *we* live in endless hiding, endure privation on the colder planets when we long for the green earth and freedom from this eternal fight against nature—and against the men whom you defend so valiantly? We owe *them* nothing but pain; circumstances force us to repay with interest!"

"You unutterable scoundrels!" said Jommy Cross contemptuously. "The powerful should use their strength to help, not to destroy, the weak."

The woman shrugged. "Well, I'm afraid that in a little while that power must destroy you. The factor that worked in your favor back at the Air Center, when our attitude was the negative one of waiting for events, cannot possibly help you now, when our attitude is the utterly positive one of destroying you with our heaviest weapons. One minute of fire will burn this machine to ashes that will fall to Earth in a fine sprinkling of dust."

"One minute!" Jommy Cross ex-

claimed sharply. "They can't possibly—"

He stopped short. He couldn't admit that he hadn't dreamed the time limit would be so short, that now he had to depend on a flimsy psychological hope that the speed of his ship would lull their suspicions. He said harshly:

"Enough of this damn talk. And I'll have to carry you into the next room. I've got to rig up a vise at the inside of the nose of the ship, and I can't let you see what I put in that vise."

FOR A bare moment before Jommy Cross landed he saw the lights of the city to the west. Then the rising wall of valley blotted the flashing sea of brilliance from his view. Soft as a thistledown, the rocketship touched the ground and floated there with an unearthly buoyancy as Jommy Cross set the anti-gravity plates at half power. He clicked open the door and then untied the slan woman.

Her electric gun in hand—his own weapon was fastened in the vise he had set up—he watched Joanna Hilory as she poised for a moment in the doorway. Dawn was breaking over the hills to the east; and the light, still a sickly gray, made a queer silhouette of her strong, shapely figure. Without a word, she jumped to the ground below. As he stepped forward to the threshold he could see her head on a level now with the bottom of the doorway, reflecting the flood of light from inside the ship.

Her head turned; and the face that looked up at him was marked by deep, thoughtful lines. She said simply:

"How do you feel?"

He shrugged. "A little shaky, but

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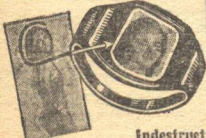


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death seems remote and not applicable to me."

"It's more than that," was the earnest reply. "The nervous system of a slant is an almost impregnable fortress. It cannot really be touched by insanity or 'nerves' or fear. When we kill, it is because of policy arrived at through logic; when death approaches our personal lives, we accept the situation, fight to the last in the hope of an unpredictable factor turning up to save us, and finally, reluctantly, give up the ghost, conscious that we have not lived in vain."

He stared at her curiously, his mind projecting against hers, feeling of the gentle pulsing of overtones, the strange half friendliness that was in her voice and overflowed from her mind. His eyes narrowed. What purpose was forming in her enormously alert, sensitive, completely unsentimental brain? She went on:

"Jommy Cross, it may surprise you to know that I have come to believe your story, and that you are not only what you say you are, but that you actually hold the ideals you have professed. You are the first true slant I have ever met; and, strangely, for the first time in my life I have a sense of tension eased, as if, after all these centuries, the deadly darkness is lifting.

"And Jommy Cross, if you escape our guns, I beg you to keep your ideals as you grow older, and please don't betray us. Don't become a tool of creatures who have used only murder and destruction for so many, many years. You have been in my mind, and you know that I have not lied to you about them. Whatever the logic of their philosophy, it's wrong because it's inhuman. It must be wrong because its result has been unending misery."

If he escaped! So that was it! If he escaped, they would be dependent on his good will; and she was playing

that angle now for all she was worth. Clever!

"But remember one thing," Joanna Hillory went on, "you can expect no help from us. Our logic, in the name of security, *must* consider you as an enemy. Too much depends upon it, the fate of too many people is involved. So do not expect at some future date to obtain mercy, Jommy Cross, because of what I have said or because you have released me. Do not come into our midst, because, I warn you, it means swift death.

"You see, we credit the true slans with superior intelligence; or, rather, superior development of intelligence, due to their mind-reading ability. There is no cunning of which we would not believe them capable, no ruthlessness they have not already equaled. A plan requiring thirty or a hundred years to mature is not beyond them. Therefore, even though I believe what you have told me, the uncertainty of how you may develop as you grow older would make me kill you this instant were it in my power.

"Do not ever test our good will. It is suspicion, not tolerance, that rules us. But now, good-by—and, paradoxical as this may sound—good luck!"

He watched her as she walked lightly, swiftly, into the darkness that lay heavily on the valley to the west, the way that led to the city—his way, too. Her form became a shadow in the mist of rapid-fading light.

She was gone over a hill. Swiftly he closed the door, rushed into the storeroom and snatched a couple of space suits from the wall. The old woman babbled in feeble protest as he stuffed her forcibly into one of them. He crowded into his own as he scrambled into the control room.

He closed the door on the sobering leer that twisted Granny's face behind the transparent headpiece, and in a second was sitting tensely staring into the "sky" visiplat.

His fingers reached for the activator of the anti-gravity plates; and then—abruptly—came the hesitation, the doubt that had been growing in him each second that brought the inexorable moment of action nearer. Was it possible that his simple plan would actually work?

JOMMY CROSS could see the ships, little dark spots in the sky above him. The Sun was shining up there, a spray of brilliance that picked out the tiny torpedo shapes like so many fly spots on an immense blue ceiling.

The clouds and the mists of the valley were clearing with magical speed; and if the clarity with which he could see *them* through his visiplates was any criterion, then even the weather was against him. He was still in the shadows of this sweet, clean little valley; but in a few minutes now the very perfection of the day would begin to damage his chances enormously.

His brain was so tensely concentrated that for a moment the distorted thought that flowed into his mind seemed to come from himself:

"—needn't worry. Old Granny'll get rid of the slan. Get some make-up and change her face. What's the good of having been an actress if you can't change your looks? Granny'll make a white, lovely body like she used to have, and change this old face. Ugh!"

She seemed to spit in convulsions at the thought of her face, and Jommy Cross eased the picture out of his mind. But her words remained with him. His parents had used false hair, but the necessary mutilation of natural hair and the

constant recutting had proved very unsatisfactory. Nevertheless, true slans must be doing it all the time; and now that he was old enough to be able to make a reasonably efficient job of it, with Granny's help and experience—it might be the answer!

Strangely, now that a plan for the future had come, his hesitation vanished. Light as a dust mote, the ship fell away from Earth, and then jerked into enormous speed as the rockets kicked into life.

Five minutes to accelerate and decelerate, the slan commander had said. Jommy Cross smiled grimly. Well, he wasn't going to decelerate. At undiminished speed, he dived for the river that made a wide black swath at the outskirts of the city, the city he had picked because the river was there. At the very last moment he put on full deceleration.

And at that final moment, when it was already too late, the logic confidence of the slan commanders must have been shaken. They forgot their reluctance to use their guns and show their ships so near a human city. They swooped like great, immensely long birds of prey; fire sparkled from all seven cruisers—Jommy Cross pulled gently on the wire that pressed the trigger on his own weapon, mounted in the vise at the nose of the ship.

From outside, a violent blow added speed to the three-hundred-mile-an-hour clip of his machine. But he scarcely noticed it, the only effect of the enemy fire; his whole attention was concentrated on his own weapon.

As he pulled the wire there was a flare of white. Instantly a two-foot circle in the foot-thick nose of the craft vanished; the white, malignant destroyer ray leaped forth fanwise, dissolving the water of the river in

front of the torpedo-shaped craft, and into the tunnel thus created slid the spaceship, decelerating at full, frightful blast of the forward tubes.

The visiplates went black with the water above and the water below, then blacker as the water ended and the inconceivable ferocity of the atom smasher bored on irresistibly into the ground beyond, deeper, deeper.

IT WAS like flying through air, only there was no resistance except the pressure of rocket blasts. The atoms of Earth, broken into their component elements, instantly lost their mathematically unreal solidity and assumed their actuality of a space tenuously occupied by matter. Ten million million years of built-up cohesion collapsed into the lowest primeval matter state.

With rigid gaze, Jommy Cross stared at the second hand of his watch: Ten, twenty, thirty—one minute. He began to ease the nose of the ship upward, but the enormous pressure of deceleration made no physical easing possible. It was thirty seconds later before he cut the number of rocket blasts and the end was in sight.

After two minutes and twenty seconds of underground flight the ship stopped. He must be near the center of the city, and there was approximately eight miles of tunnel behind him, into which water would be pouring from the tortured river. The water would close up the hole, but the baffled tendrillless slans would need no interpreter to tell them what had happened. Besides, their instruments would this very second be pointing directly at the location of his ship.

Jommy Cross laughed joyously. Let them know. What could they hope to do to him now? There was

danger ahead, of course—immense danger; especially when he and Granny reached the surface. The entire ground organization of the tendrillless slans must be warned by now.

Nevertheless, that was of the future. For the moment, victory was his; and it was sweet, after so many desperate, tiring hours. Now there was Granny's plan, which involved his separating from her, and disguise.

The laughter faded from his lips. He sat thoughtful, then stalked into the adjoining compartment. The black moneybag he wanted lay on the old woman's lap, under the protection of one clawlike hand. Before she could even realize his intention, he had snatched it up.

Granny shrieked and jumped at him. Coolly he held her off.

"Don't get excited. I've decided

to adopt your plan of make-up and that the two of us separate. I'm going to give you five thousand of this. The rest you'll get back about a year from now. Here's what you're to do:

"I need a place to live; and so you're going to go up into the mountains and buy a ranch or something. When you're located, put an ad in the local paper; I'll put an answering ad in, and we'll get together. I'll keep the money just in case you decide to double-cross me. Sorry, and all that, but you captured me in the first place, and so you'll just have to bear up with me.

"And now I've got to go back and block that tunnel. Some day I'm going to fit this ship with atomic energy, and I don't want *them* coming here meanwhile."

He'd have to leave this city fast, of course, for the time being—the be-

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ginning of a continental tour. There must be other tendrilled slans out there; and, just as his mother and father had met accidentally, pure chance alone should enable him to meet at least one slan. And besides, there was the first investigations to be made on the still vague, though great, plan that was taking form in his brain: the plan to *think* his way to the true slans.

XI.

JOMMY CROSS seemed always to be driving along roads that gleamed toward distant horizons, or in strange cities—each with its endless swarm of human beings. The Sun rose and set, and rose and set; and there were dark days of drizzling rain, and there were countless nights.

In spite of aloneness, loneliness did not touch him, for his expanding soul fed with an always dissatisfied eagerness at the tremendous drama that was daily enacted before his eyes. Everywhere he turned, the incredibly complex network of the tendrillless-slan organization met his gaze; and week by week he grew more puzzled. Where were the true slans?

The fantastic puzzle seemed a crazy, unanswerable thing that never left him. It haunted him in the quiet fastness of his small, well-equipped laboratory on Granny's valley ranch—it forced him on endless miles of journey in heartbreaking, futile search—it followed him now as he walked slowly up a street of the hundredth, or was it the thousandth, city?

Night lay upon the city, night spattered by countless glittering shop windows and a hundred million blazing lights. He walked to a newsstand and bought all the local papers, then back to his car, that very ordinary-looking, very special battleship on wheels which he never allowed out of his sight.

He stood beside the long, low-

built machine. A chilling night wind caught at the sheets of one paper as he turned page after page, briefly letting his gaze skim down the columns.

The wind grew colder as he stood there, bringing the damp-sweet smell of rain. A gust of chill air caught an edge of his paper, whipped it madly for a moment, abruptly tore it, then went screaming victoriously down the street, chasing the scrap of paper wildly.

He folded the newspaper decisively against the rising clamor of wind and climbed into the car. An hour later he tossed the seven daily papers into the corner waste-paper receptacle. Deep in thought, he re-entered the car and sat behind the steering wheel.

The same old story. Two of the papers were tendriless slan. It was easy for his mind to note the subtle difference, the special coloration of the articles, the very way words were used—the distinct difference between the human-owned papers and those operated by the tendriless slans. Two papers out of seven. But those two the ones with the highest circulation. It was a normal average.

And, once more, that was all there was. Tendriless slan and human being. No third group, none of the difference that he knew would show him when a paper was operated by true slans—if his theory was right.

It remained only to obtain all the weekly papers, and to spend the evening as he had spent the day, driving up and down the streets, searching each house, each passing mind; and then, as he drove toward the distant east, the gathering tempest charged like some maddened beast through the black night.

Behind him, the night and the storm swallowed up another city, another failure.

THE WATER lay dark and still around the spaceship in that third year when Jommy Cross finally returned to the tunnel. Like a creature out of the night, he swirled around in the mud, turning the blazing force of his atomic-powered machines on the wounded metal thing.

Ten-point steel seared over the hole his disintegrator had carved on that day when he escaped the slan cruisers. And all through one almost endless week a snug-fitting, leech-shaped, metal monstrosity hugged inch by inch over the surface of the ship, straining with its frightful power at the very structure of the atoms—till the foot-thick walls of the long, sleek machine were ten-point steel from end to end.

It took him some weeks to analyze the anti-gravity plates with their electrically built-up vibrations, and to fashion a counterpart, which, with grim irony, he left there in the tunnel—for it was on them that the detectors of the tendriless slans operated. Let them think their craft still there.

Three months he slaved; and then, in the dead of one cold October night, the ship backed along six miles of tunnel on a cushion of resistless atomic drive, and plunged up through a mist of icy rain. The rain became sleet, then snow; then abruptly he was beyond the clouds, beyond Earth's petty furies. Above him, the vast canopy of the heavens glittered in a blazing array of stars that beckoned to his matchless ship.

There was Sirius, brightest jewel in that diadem; and there was Mars the red—but not for Mars was he heading today. Only a short, careful, exploratory voyage, this; a brief, cautious trip to the Moon, a test flight to provide that all-necessary experience which his logic would use as a basis for the long, dangerous

journey that seemed to be becoming more inevitable with each passing month of his utterly futile search. Some day he would have to go to Mars.

Beneath him a blur of night-enveloped globe receded. At one edge of that sky-spreading mass, a blaze of light grew more brilliant as he watched—and then, abruptly, the fascinating glory of the approaching sunrise was jarred by the clanging of an alarm bell.

A pointer light flashed on and off discordantly far up on his forward visiplate. Decelerating at full speed, he watched the changing position of the light. Suddenly the light clicked off, and there, at the extreme range of his vision, was a ship.

THE BATTLESHIP WAS not coming directly toward him. It grew larger, became plainly visible just beyond the Earth's shadow, in the full glare of the Sun. It passed by him, less than a hundred miles away, a thousand-foot structure of smooth, dark metal.

It plunged into the shadows and instantly vanished. In half an hour the alarm stopped ringing.

And then, ten minutes later, it was clamoring again. The second ship was farther away, traveling at right angles to the path of the first. It was a smaller ship by far, destroyer size; and it did not follow a fixed path, but darted here and there.

When it was gone in the distance, Jommy Cross edged his ship forward, undecided now, almost awed. A battleship and a destroyer! Why? It seemed to indicate a patrol. But against whom? Not against humans, surely; they didn't even know the tendrillless slans and their ships existed.

He slowed his ship, stopped. He was not prepared yet to risk running

a gantlet of well-equipped battleships. Watchfully, he swung his ship around—and in the middle of the turn he saw the small dark object, like a meteorite, rushing toward him.

In a flash he whipped aside—and the object twisted after him like a living monster of space. It loomed far up in his rear visiplate, a dark, round metal ball, about a yard in diameter. Frantically, Jommy Cross tried to maneuver his ship out of its path, but before he could make a turn there was a deafening, mind-shattering blast.

The explosion smashed him to the floor, the concussion kept him there, stunned, sick but still alive, and conscious that those sturdy walls had taken the almost intolerable blow.

The ship was rocking in frightful acceleration. Dizzily, Jommy Cross picked himself up and climbed back into the control chair. He'd struck a mine! By all the gods, a floating mine! What terrifying precautions were here—and against what!

Thoughtfully, he maneuvered his dented, almost disabled ship into a tunnel under the river that cut through Granny's ranch, a tunnel that curved up into the heart of a mountain peak, clear of the water that swirled after it.

How long it must remain hidden there he could not even hazard a guess. Only one thing was certain. He was not ready yet to either oppose or outwit the tendrillless slans—not ready, not ready.

TWO DAYS later, Jommy Cross stood in the doorway of the rambling ranchhouse and watched their nearest neighbor, Mrs. Lanahan, come tight-lipped along the pathway that led between the two orchards. She was a plump blonde whose round baby face concealed a prying mali-

cious mind. Her blue eyes glowed at Granny's tall, brown-haired, brown-eyed grandson with suspicion.

Jommy Cross eyed her with grim amusement as he opened the door for her and followed her into the house. In her mind was all the ignorance of the long-on-the-land in a world where education had become a pale shadow, a weak, characterless reflection of official cynicism. She didn't know exactly what a slan was, but she thought he was one, and she was there to find out. She made an interesting experiment for his crystal method of hypnotism. It was genuinely fascinating to watch the way she kept glancing at the tiny crystal he had put on the table beside her chair—observing the way she talked on, completely in character, never realizing when she ceased to be a free agent and became his slave.

She walked out finally into the glare of the late-fall sunshine, apparently unchanged. But forgotten was the errand that had brought her to the farmhouse, for her mind was conditioned to a new attitude toward slans: Not hatred—that was for a possible future that Jommy Cross could envision; and not approval—that was for her own protection in a world of slan haters.

The following day he saw her husband, a black-bearded giant of a man in a distant field. A quiet talk, a differently attuned crystal, brought him, too, under control.

During the months that he relaxed with the hypnotically sweetened old woman that had been Granny, he gained mental control of every one of the hundreds of farm people who dwelt in the idyllic climate of the valley there in the ever-green foothills. At first he needed the crystals, but as his knowledge of the human mind grew, he found that, although it was a slower process, he could en-

tirely dispense with that atomically unbalanced glass.

He estimated: At the rate of two thousand hypnotized a year, and not allowing for new generations, he could hypnotize the four billion people in the world in two million years. Conversely, two million slans could do it in a year, provided they possessed the secret of his crystals.

Two million needed; and he couldn't even find one! Damn it, somewhere there *must* be a true slan. And during the years that still must pass before he could logically pit his intelligence against the intellectual task involved in finding the true slan organization, he must search and search for that one!

XII.

SHE was trapped. Briefly, Kathleen Layton grew tense; her slim young body straightened there beside the open drawer of Kier Gray's desk, the contents of which she had been studying. Her mind reached out with startled alertness, through intervening doors to where Kier Gray and another man were opening the door that led from her room through a corridor and another room to this—the dictator's own study.

She was conscious of desperate chagrin. For weeks she had waited for the council meeting that would claim Kier Gray's attendance and give her safe access to his study—and now this wild accident: for the first time in her experience, Kier Gray had gone to her room instead of summoning her to him. With all the other exits guarded, her one avenue of escape had been cut off and—

She was trapped! But not for one second did she regret her action in coming. An imprisoned slan could have no purpose but escape from a deadly, apparently unending routine.

The seriousness of her position struck deeper instant by instant. To be caught here red-handed— Abruptly she ceased putting the papers back into the drawer. No time. The men were just beyond the door now.

With sudden decision she closed the drawer, jerked the papers into a roughly neat pile at one side of the desk; and, like a fleeing fawn, rushed to an easy-chair.

Simultaneously, the door opened; and John Petty came in, followed by Kier Gray. The two men stopped as they saw her. The police chief's darkly handsome, slightly in-curved face took on darker color; his eyes narrowed to slits; then his gaze flickered questioningly to the dictator.

The leader's eyebrows were lifted quizzically, and there was the faintest hint of irony in the smile that came into his face.

"Hullo," he said, "what brings you here?"

Kathleen had come to a decision about that, but before she could speak, John Petty cut in; the man had a beautiful voice when he wanted to use it, and he used it now. He said gently:

"She's obviously been spying on you, Kier."

There was something about this man with his incisive logic that brought a chilling alarm to the girl. It seemed to be the dark destiny of the secret-police chief to be present at the critical moments of her life; and she knew with a stiffening of her courage that here was such a moment; and that of all the people in the world, John Petty would strive with the full passion of his hatred for her to make it deadly.

THE POLICE head went on calmly: "Really, Kier, we come dramatically back to what we were discussing: Next week this slan girl will be

twenty-one years of age, for all normal purposes an adult, though as a slan she will not attain maturity till she's thirty. Is she to live on here till she eventually dies of old age a hundred and fifty or some such fantastic term of years from now? Or what?"

The smile on Kier Gray's face was grimmer. "Kathleen, didn't you know I was at the council meeting?"

"You bet she knew," John Petty interjected, "and its unexpected ending came as an unpleasant surprise."

Kathleen said coldly: "I refuse to make replies to any questioning in which that man participates. He's trying to keep his voice calm and logical, but, in spite of the queer way in which he hides his thoughts, there is already a distinct glow of excitement streaming from him; and the thought has come to the surface of his mind that at last he will be able to convince you that I ought to be destroyed."

The leader's face was oddly hostile in the thoughtfulness that came into it. Her mind touched lightly at the surface of his brain, and there was a forming thought there, a developing decision, impossible to read. He said finally:

"Historically speaking, her charge against you is true, John. Your desire for her death is . . . er . . . proved—a tribute, of course, to your anti-slan zeal, but a queer fanaticism in so enormously capable a man."

John Petty seemed to shake off the words in the impatient gesture he made. "The truth is, I want her dead and I don't want her dead. To me she constitutes a grave menace to the State, located here in the palace and possessing mind-reading ability. I simply want her out of the way; and, being unsentimental about slans, I consider death the most effective method.

"However, I will not urge such a verdict in view of my reputation for bias in this case. But I seriously think she should be moved to a different residence."

There was no thought near the surface of Kier Gray's mind to suggest that he intended to speak. His eyes were on her, unnecessarily steady. Kathleen said scathingly:

"The moment I am removed from this palace I will be murdered. As Mr. Gray said in effect ten years ago, after *your* hireling tried to murder me, once a slane is dead, inquiries about the affair are viewed with suspicion."

She saw that Kier Gray was shaking his head at her. He said in the mildest, most unconvincing tone she had ever heard him use: "You assume far too readily, Kathleen, that

I cannot protect you. On the whole, I think it is the best plan."

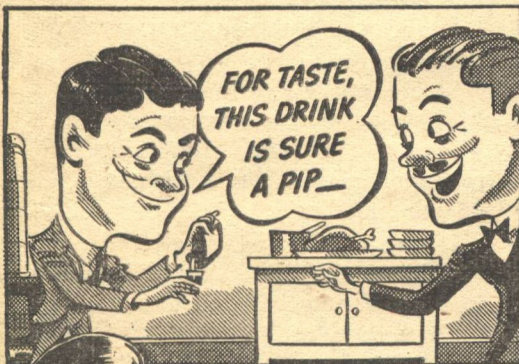
She stared at him, stiff with dismay. He finished the virtual death sentence, his voice no longer mild, but even-toned, decisive:

"You will gather your clothes and possessions and prepare yourself for departure in twenty-four hours."

KATHLEEN simply stood there. After the first moment the shock of it passed. Nor was it incredulosity that kept her silent. Her mind was basically quite calm. The knowledge that Kier Gray had withdrawn his protection from her was too crystal-clear a realization for her to require any anticlimax of emotional disbelief.

What astounded her was that there was as yet no evidence on

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which he could have based a criminal judgment. He hadn't even glanced at the papers she had arranged so hurriedly on the desk. Therefore, his decision was based on the mere fact of her presence here and on John Petty's accusations.

Which was surprising, because he had in the past defended her from Petty under far more sinister circumstances. And she had come unpunished, unchecked, into this study on at least half a dozen other occasions.

It meant—his decision had been previously made, and therefore was beyond any argument she could hope to offer. In abrupt surprise, she grew aware that there was amazement, too, in John Petty's brain. The man was frowning at his easy victory; the surface of his mind vibrated briefly a small stream of dissatisfaction, then abrupt decision to clinch the matter.

His gaze flicked keenly over the room and came to rest on the desk. "The point is, what did she find out while she was alone in your study? What are those papers?"

He was not a shy man; and even while he asked the question he was stalking to the desk. As the leader came over behind him, Petty rippled through the sheets.

"Hm-m-m, the list of all the old slant hide-outs which we still use for trapping the unorganized slants. Fortunately, there are so many hundreds of them that she couldn't have had time to memorize their names, let alone descriptions of their locations."

The falseness of his conclusion was not what concerned Kathleen in that moment of discovery. Evidently neither man suspected that the location of every one of the slant hide-aways was not only imprinted indelibly on her mind, but that she had an almost photographic record of the alarm systems which the secret police had installed in each unit to

warn them when an unsuspecting slan was entering. According to the shrewd analysis of one report, there must be some kind of thought broadcaster which made it possible for strange slans to locate the hiding places. But that was unimportant just now.

What counted was Kier Gray. The leader was staring curiously at the papers. "This is more serious than I thought," he said slowly, and Kathleen's heart sank. "She's raided my desk."

Kathleen thought tensely: It wasn't necessary for him to let John Petty know that. The old Kier Gray would never have provided her worst enemy with an ounce of ammunition to use against her.

Kier Gray's eyes were cold as he turned to her. Strangely, the surface of his brain showed as calm and cool as she had ever known it to be. He was, she realized—abruptly calm herself—not angry, but, with an icy finality, breaking with her.

"You will go to your room and pack—and await further instructions."

She was turning away as John Petty said: "You have said on various occasions, sir, that you were keeping her alive for observation purposes only. If you move her from your presence, that purpose is no longer applicable. Therefore, I hope I am safe in assuming that she will be placed under the protection of the secret police."

KATHLEEN shut her mind to their two brains as she closed the door behind her and raced along the corridor to her room. She felt not the vaguest interest in the details of any hypocritical murder plan which might be worked out between the leader and his henchman.

Her course was clear. She opened

the door leading from her room to one of the main corridors, nodded to the guard, who acknowledged her greeting stiffly—and then she walked calmly to the nearest elevator.

Theoretically, she was only allowed to go to the five-hundred-foot level, and not to the plane hangars, five hundred feet farther up. But the stocky young soldier who operated the elevator proved no match for the blow that struck him slantingly on the jaw. Like most of the other men, Kathleen saw in his mind he had never accepted the statement that this tall, slender, devastatingly pretty girl was dangerous to a two-hundred-pound male in the prime of strength.

He was unconscious before he discovered his mistake. It was cruel, but she tied his hands and feet with wire and used wire to tie the gag into his mouth.

Arrived at the roof, she made a brief, thorough mind exploration of the immediate vicinity of the elevator. Finally she opened the door, then swiftly shut it behind her. There was a plane less than thirty feet away. Beyond it was another plane on which three mechanics were working. A soldier was talking to them.

It took her only ten seconds to walk to the plane and climb in; and she had not picked the brains of air officers for nothing during the long years. The motor purred; the great machine glided forward; helicopters spinning madly, it launched into the air.

"Huh," the thoughts of a mechanic came after her, "there goes the colonel again."

"Probably off after another woman." That was the soldier.

"Yeah," said the second mechanic, "trust that guy to—"

It took two hours of the swiftest

southwest flying to reach the slan hide-out she had selected. She set the plane on robot control and watched it fly off into the east. During the days that followed, she watched hungrily for a car; it was on the fifteenth day that a long, black machine purred out of a belt of trees along the ancient roadway and came toward her. Her body tensed. Somehow she had to get that driver to stop, overpower him—and take his car. Any hour now the secret police would be swooping down—she must get away from here, and fast. Eyes fixed on the car, she waited.

XIII.

THE FLAT, wintry vastness of the prairie was behind him at last. Jommy Cross turned north, then south. Far south! And ran into an apparently endless series of police barricades. No effort was made to stop him; and he saw in the minds of the men that they were searching for a girl.

The number of police increased; and finally, as a precaution, he deserted the main highway for a quiet side road that wound down into tree-filled valleys, and up over tall hills. The morning had been gray, but at noon the sun came out and shone gloriously from a sky of azure blue.

The clear-cut impression of well-being ended abruptly as an outside thought touched his mind; a gentle pulsation it was, yet so tremendous that his brain rocked:

“Attention, slans! Please turn up the side road half a mile ahead. A further message will be given later.”

He caught his spinning mind, stiffened the blurred confusion of trees and grass and blue-bright skies into coherency—soft and insistent, the flowing thought waves of the message beat at him over and over,

gentle as a summer rain:

“Attention, slans! Please turn—”

He drove on, the very blood in his veins singing with a high excitement. After all these—ages—the miracle had happened. Slans! Somewhere near! And many of them! Such a thought machine might have been developed by an individual, but the message suggested somehow the presence of a community; and it could be true slans—or could it?

The swift, sweet flow of his joy became a trickle as his mind pondered the possibility of a monstrous trap. No real danger, of course; not with this car to deflect dangerous blows and his weapons to paralyze the striking power of any enemy. But it was just as well to be prepared.

UNHESITATING, the beautiful, streamlined machine rolled forward; in less than a minute Jommy Cross saw the pathway—it was little more than that. The abnormally long car whipped into it and along it; the pathway wound through heavily wooded areas, through several small valleys. It was three miles before the next message brought him to an abrupt stop:

“This is a Porgrave broadcaster. It directs you, a true slan, to the little farm ahead, which provides entrance to an unground city comprising factories, gardens and residences. Welcome. This is a Porgrave—”

There was a great bouncing as the car struck a row of small ridges; and then the machine broke through a thick hedge of yielding willows and emerged into a shallow clearing. Jommy Cross found himself staring across a weed-grown yard to where a weather-beaten farmhouse drooped beside two other age-weary buildings: a barn and a garage.

Windowless, unpainted, the rick-

ety old two-story house gaped sight-lessly at him. The barn tottered like the ancient hulk that it was, its roller door hooked on one roller only, and the other end edged deep into the forsaken soil.

His gaze flashed briefly to the garage, then away, then back again thoughtfully. There was the same appearance of something long dead—and yet, somehow, it was different. The subtle difference grew on him, bringing interest in its wake. The garage seemed to totter, but it was by design, not through decay. There were hard metals here, rigidly set against the elements.

The apparently broken doors leaned heavily against the ground, yet opened lightly before the pressing fingers of the tall, lithely built young woman in a gray dress who came out and gazed at him with a dazzling smile.

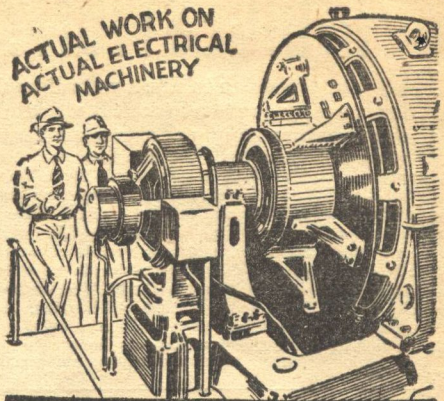
She had flashing eyes, this girl, and a finely molded, delicately textured face, and because his mind was always held on a tight band of thought, she came out thinking he was a human being.

And she was a slant!

And he was a slant!

SIMULTANEOUS discovery! For Jommy Cross, who had searched the world with caution for so many long years, his mind always on the alert, recovery was instantaneous. But for Kathleen, who had never had to conceal her thoughts, the surprise was utter and devastating. She fought for control and found herself uncontrollable. The little-used shield was suddenly, briefly, unusable.

There was a noble pride in the rich flow of thought matter that streamed from her mind in that instant when her brain was like an open, unprotected book. Pride, and a golden humility. Humility based on a deep sensitivity, an immense



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understanding that equaled his own, yet lacked the tempering of unending struggle and danger. There was a warm good-heartedness in her that had nevertheless known resentment and tears, and faced the grim urgency of hate unlimited.

And then her mind closed tight, and she stood there wide-eyed, looking at him. After a long moment she unlocked her mind and let a thought reach out to him:

"We mustn't stay here. I've been here too long already. You probably saw in my mind about the police, so the best thing we can do is to drive away immediately."

He just sat there, gazing at her with shining eyes. Each passing second, his mind expanded more; his whole body felt warm with the richness of pure joy. The sky was blue and cloudless, the Sun was bright, and all the world was fair!

It was like an intolerable weight lifting. All these years everything had depended on him; the great weapon he held in trust for that future world he sometimes dreamed of, held suspended like a monstrous sword of Damocles over the destiny of human and slant alike by the single, fragile thread of his life. And now—there would be two life threads to control it.

It was not a thought, but an emotion; all sad, sweet, glorious emotion. A man and a woman, alone in the world, meeting like this, just as his father and mother had met long ago. He smiled reminiscently and opened his mind wide to her. He shook his head:

"No, not right away. I caught a flash from your mind about the machines in the cave city, and I would like to have a look at them. Heavy machinery is my greatest lack."

He smiled reassuringly. "Don't worry too much about the danger. I have some weapons that human beings cannot match, and this car is a

very special means of escape. It can go practically anywhere. I hope there is room for it in the cave."

"Oh, yes. First you go down by a series of elevators. Then you can drive anywhere. But we mustn't delay. We—"

Jommy Cross laughed happily. "No buts!" he said.

LATER, Kathleen repeated her doubts: "I really don't think we ought to stay. I can see in your mind about your marvelous weapons, and that your car is made of a metal you call ten-point steel—but you also have a tendency to discount human beings. You mustn't! In their fight against slans, men like John Petty have had their brains keyed to a pitch of abnormal power. And John Petty will stop at nothing to destroy me. Even now his net must be tightening systematically around all the various slan hiding places where I may be."

Jommy Cross stared at her with troubled eyes. All around was the silence of the cave city; the once-white walls that pushed bravely up to the cracking ceiling; the row on row of pillars, bent and worn more from the weight of years than of the heavy earth that pressed them down.

To his left he could see the beginning of the great expanse of artificial garden and the gleaming underground stream that fed water to this little sub-world. To his right stretched the long row of apartment doors, the woodwork still gleaming dully of the old-time "Eternity" varnish.

A people had lived here and had been driven forth by their remorseless enemies, but the menacing atmosphere of that long-ago flight seemed to linger still; his thought answer to Kathleen reflected the grim threat of that lowering danger:

"By all the laws of logic, we have only to be on the alert for outside thoughts and stay within a few hundred yards of my car to be absolutely safe. Yet I am alarmed by your intuition of danger. For intuition, based as it is on the subconscious mind's interpretation of more facts than the conscious mind can grasp at one time, is frequently the only reliable prophet. Please search your brain, as no outsider such as myself can, and try to discover the basis for your fear."

The girl was silent; her eyes closed; her shield went up; she sat there beside him in the car, looking strangely like a beautiful overgrown child fallen asleep. Finally her sensitive lips twitched; for the first time she spoke aloud:

"Tell me, what is ten-point steel?"

"Ah," said Jommy Cross in satisfaction, "I'm beginning to understand the psychological factors involved. Mental communication has many advantages, but it cannot convey the extent, for instance, of a weapon's power as well as a picture on a piece of paper, or not even as well as by word of mouth. Power, size, strength and similar images do not transmit well."

"Go on."

"EVERYTHING I've done," Jommy Cross explained, "has been based on my father's great discovery of the first law of atomic energy—concentration as opposed to the old method of diffusion. So far as I know, father never suspected the metal-strengthening possibilities, but, like all research workers who come after the great man and his basic discovery, I concentrated on details of development, partly based on his ideas, partly on ideas that progressively suggested themselves.

"All metals are held together by

atomic tensions, which comprise the theoretical strength of that metal. In the case of steel, I called this theoretical potential one-point. As a comparison, when steel was first invented, its strength was about two thousand-point. New processes rapidly increased this to around one thousand; then, over a period of hundreds of years to the present human level of seven hundred and seventy. Tendrilless slans have made five-hundred-point steel, but even that incredibly hard stuff cannot begin to compare with the product of my application of atomic strain, which changes the very structure of the atoms and produces the almost perfect ten-point steel.

"An eighth of an inch of ten-point can stop the most powerful explosive shell known to human beings. Unfortunately, it does not stand up so well against the weapons of the tendrilless slans!"

Briefly, he described his attempted trip to the Moon and the mine that sent him scurrying home, badly smashed. He concluded:

"But the important thing to remember there is that an electric-energy mine, obviously big enough to blow up a giant battleship, did not actually penetrate a foot of ten-point, though the hull was badly dented and the engine room a shambles from the transmitted shock."

Kathleen was gazing at him, eyes shining. "What a silly fool I am," she breathed. "I've met the greatest living slan and I'm trying to fill him with the fears gathered from twenty-one years of living with human beings and their comparatively infinitesimal powers and forces."

Jommy Cross shook his head smilingly. "Unfortunately, the big shot was not me, but my father—though he had his faults, too, the biggest one being lack of adequate self-protect-

tion. But that's true genius for you." The smile faded. "I'm afraid, though, that we'll have to make frequent visits to this cave, and every one will be just as dangerous as this one. I have met John Petty very briefly, and what I've seen in your mind only adds to a picture of a ruthlessly thorough man. He's bound to keep a watch on this place, and really, we cannot allow ourselves to be frightened by such a prospect.

"We'll stay only till dark this time—just long enough for me to examine the machinery. There's some food in the car that we can cook after I've had a little sleep. I'll sleep in the car, of course. But first, the machinery!"

EVERYWHERE the big machines sprawled, like corpses, silent and moldering. Blast furnaces, great stamping machines, lathes, saws, countless engined tools—a half mile of row on tight row of machines, about thirty percent completely out of commission, twenty percent partially useless, and the rest usable up to a point.

The unwinking, glareless lights made a shadowed world as they wandered along that valley of broken floor in and out among the machine hills. Jommy Cross was thoughtful.

"There's more here than I imagined—everything I have always needed. I can build a great battleship with the scrap metal alone; and they use it only as a slan trap." His thought narrowed on her mind: "Tell me, you're sure there are only two entrances to this city?"

"There were only two entrances given on the list in Kier Gray's desk—and I've located no others."

He was silent, but he did not conceal the tenor of his thoughts from her: "Foolish of me to think again of your intuition, but I don't like to

let a possible menace out of my mind till I've examined every connective possibility."

"If there is a secret entrance," Kathleen volunteered, "it would take us hours to find it; and if we found one, we couldn't be sure there wouldn't be others; and so we'd feel no safer. I still believe we should leave immediately."

Jommy Cross shook his head decisively. "I didn't let you see this in my mind before, but the main reason I don't want to leave here is that, until your face is disguised and your tendrils hidden by false hair—a really heartbreakingly difficult job—this is the safest place for both of us. Every highway is being watched by the police. Most of them don't know they're looking for a slan, but they have your picture. I turned off the main road in the first place rather than run the risk of being stopped."

"Your machine goes up, doesn't it?" Kathleen asked.

Jommy Cross smiled mirthlessly. "Seven hours yet till dark; and every other minute we'd run into a plane. Imagine what the pilots would radio to the nearest military airport when they saw an automobile flying through the air; and if we go higher, say fifty miles, we'll surely be seen by a tendrillless slan patrol ship. The first commander will realize instantly who it is, report our positions, and attack. I've got the weapons to destroy him, but I won't be able to destroy the dozens of ships that follow—at least not before potent forces strike this car so hard that concussion alone will kill us.

"And besides, I cannot willfully put myself in a position where I may have to kill anybody. I've only killed three men in my life; and every day since then my reluctance to destroy human beings has grown until now it is one of the strongest forces in me—so strong that I have based

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my whole plan for finding the true slans on an analysis of that one dominant trait."

The girl's thought brushed his mind, light as a breath of air. "You have a plan for finding the true slans?" she questioned.

He nodded. "Yes. It's really very simple. All the true slans I have ever met—my father, my mother, myself, and now you—have been good-hearted, kindly people. This in spite of human hatred, human efforts to destroy us. I cannot believe that we four are exceptions; and therefore there must be some reasonable explanation of all the monstrous acts which true slans seem to be committing."

He smiled laconically. "It's probably presumptuous of me even to have a thought on the subject at my age and limited development. Anyway, I'm afraid it's been an utter failure so far. And the laws of logic tell me that I mustn't make a major move in the game until I've reached slant maturity eleven years from now."

Kathleen's eyes were fixed on him. She nodded agreement. "I can see, too," she said, "why we must stay here another seven hours."

Queerly, he wished she hadn't brought up that subject again. Because, for the barest moment—he hid the thought from her—a premonition of a black, incredible danger flashed into him. So incredible that logic smashed it aside. The vague backwash of it that remained made him say:

"Just stay near the car and keep your mind alert. After all, we can spot a human being a quarter of a mile away even while we're sleeping."

Oddly enough, it didn't sound the slightest bit reassuring.

At first Jommy Cross only dozed. He must have been partly awake for some minutes, because though his

eyes were closed he was aware of her mind near him, and that she was reading one of his books. Once, so light was his sleep, the question came into his mind:

"The ceiling lights—do they stay on all the time?"

She must have reached softly into his brain with the answer, for suddenly he knew that the lights had been on ever since she came, and must have been like that for hundreds of years.

There must have been a question in her mind, for his brain made an otherwise unwarranted answer: "No, I won't eat until I've had some sleep."

Or was that just a memory of something previously spoken?

Still he wasn't quite asleep, for a queer, glad thought welled up from deep inside him: It was wonderful to have found another slan at last, such a gorgeously beautiful girl.

And such a fine-looking young man.

Was that his thought or hers, he wondered sleepily.

It was mine, Jommy.

What a rich joy it was to be able to entwine your mind with another sympathetic brain so intimately that the two streams of thought seemed one; and question and answer and all discussion included instantly all the subtle overtones that the cold medium of words could never transmit.

Were they in love? How could two people simply meet and be in love when, for all they knew, there were millions of slans in the world, among whom might be scores of other men and women they might have chosen under other conditions?

It's more than that, Jommy. All our lives we've been alone in a world of alien men. To find kindred at last is a special joy; and meeting all the

slans in the world afterward will not be the same. We're going to share hopes and doubts, dangers and victories. Above all, we will create a child. You see, Jommy, I have already adjusted my whole being to a new way of living. Is that not true love?

He thought it was, and was conscious of great happiness. But when he slept, the happiness seemed no longer there—only a blackness that became an abyss down which he was peering into illimitable depths.

He awakened with a start; his narrowed, alert eyes flashing to where Kathleen had been sitting. The seat was empty. His sharpened mind, still in the thrall of his dream, reached out.

"Kathleen!"

KATHLEEN'S cheerful thought came immediately: "I'm here, in the kitchen. As soon as I saw you were going to waken, I collected some of your canned goods, and they're now on the stove."

From where his car was parked, he could see down the line of apartment doors to the archway that led into the great community kitchens. Two hundred yards. That was all right.

"O. K.!" his mind said. "I'll be right there."

He was climbing toward the steering wheel when her next thought came, on a strange, high, urgent vibration:

"Jommy—the wall's opening! Somebody—"

Abruptly her own thought broke off and she was transmitting a man's words:

"Well, if it isn't Kathleen," John Petty was saying in cold satisfaction. "And only the fifty-seventh hide-out I've visited. I've been to all of them personally, of course, because few

other humans could keep their minds from warning you of their approach, and besides, nobody could safely be trusted with such an important assignment. What do you think of the psychology of building these secret entrances to the kitchen? Apparently even slans travel on their stomachs."

Beneath Jommy Cross' swift fingers, the car leaped forward. He caught Kathleen's reply, cool and unhurried:

"So you've found me, Mr. Petty"—mockingly. "Am I, then, to be seech your mercy?"

The icy answer streamed through her mind to Jommy Cross: "Mercy

is not my strong point. Nor do I delay when a long-awaited opportunity offers."

"*Jommy, quick!*"

The shot echoed from her mind to his. For a terrible moment of intolerable strain, her mind held off the death that the crashing bullet in her brain brought.

"Oh, Jommy, and we could have been so happy. Good-by, my dearest—"

In a desperate dismay, he followed the life force as it faded in a flash from her mind. The blackout wall of death suddenly barred his mind from that that had been Kathleen's

TO BE CONCLUDED.

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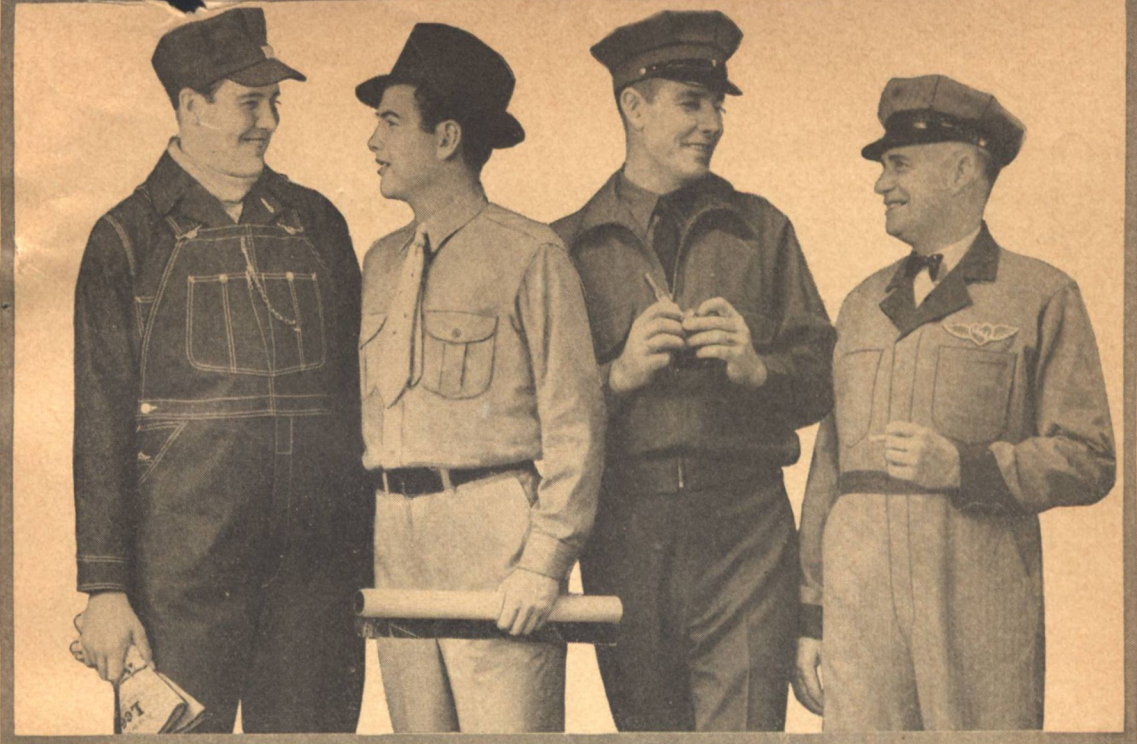
leaped on the intruder and drove him out of their enclosure.

Nissen and Crawford, "to test their spirit of co-operation, made food available in problem situations which could be solved only by the united effort of two individuals." They placed food in a box too heavy for a single chimpanzee to move, and fastened two ropes to it, one leading to each cage. Both chimpanzees worked on the box separately but neither was able to pull it toward him. Then, accidentally, both pulled on the ropes at the same time and their problem was solved.

The two were separated and put into cages next to animals who knew nothing about the box and the ropes. However, when the experiment was repeated, the two chimpanzees who had taken part in it before didn't allow their new associates to waste any time experimenting. They told them at once what to do to obtain the food in the box.

Dr. Robert Yerkes, director of the Yale Laboratory of Primate Biology, believes that the resemblance between apes and people are much greater than the differences. He says, "The work we are doing now will shortly revolutionize inquiry into similar facts concerning human beings. We shall find that the facts discovered concerning chimpanzees will be the same facts we shall discover concerning human beings. I will stake my reputation as a prophet on this prediction."





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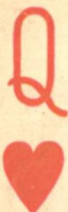
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